National Park Service
U.S. Department of the Interior

Herbert Hoover National Historic Site
Iowa

Final Hoover Creek Stream Management Plan and Environmental Impact Statement

June 2006

Birthplace Cottage (NPS Photo)

This page intentionally left blank.

Final Hoover Creek Stream Management Plan and Environmental Impact Statement

Herbert Hoover National Historic Site, Iowa

This Final Stream Management Plan / Environmental Impact Statement (SMP/EIS) evaluates five alternatives designed to increase protection of the historic and cultural resources of Herbert Hoover National Historic Site and restore stream function in Hoover Creek:

- Alternative A: No Action/Continue Current Management
- Alternative B: Provide 10-Year Flood Protection
- Alternative C: Provide 15-Year Flood Protection
- Alternative D: Provide 25-Year Flood Protection
- Alternative E: Provide 50-Year Flood Protection, the Preferred Alternative

This document analyzed potential impacts to cultural resources, water resources, visitor understanding and appreciation, public health and safety, park operations, soils, vegetation, and wildlife.

Public Comment

The draft environmental impact statement was on public review following publication of the notice of availability in the *Federal Register* by the Environmental Protection Agency beginning September 9, 2005. Public comments were accepted through November 9, 2005. The substantive comments received and their respective NPS responses are included in the Consultation and Coordination section of this final environmental impact statement. All submissions from organizations, businesses, and individuals identifying themselves as representatives or officials of organizations or businesses are available for public inspection in their entirety.

Stream EIS
Herbert Hoover National Historic Site
110 Parkside Drive
P.O. Box 607
West Branch, Iowa 52358-0607

This page intentionally left blank.

EXECUTIVE SUMMARY

Herbert Hoover National Historic Site (the park), located in West Branch, Iowa, 10 miles east of Iowa City, was established on August 12, 1965. The historic buildings and grounds of this 187-acre site preserved by the National Park Service (NPS) and the Herbert Hoover Presidential Library-Museum (Library-Museum) managed by the National Archives and Records Administration commemorate the life of the 31st President of the United States.

The tributary of the west branch of Wapsinonoc Creek that runs through the park has no official name, but is referred to as "Hoover Creek." Hoover Creek forms within the park as two small tributaries entering from the north and west where it flows to the east through the heart of the park and exits the park upstream of its confluence with the west branch of Wapsinonoc Creek.

This final Stream Management Plan / Environmental Impact Statement (SMP/EIS) evaluates a range of management actions designed to increase protection of the historic and cultural resources of Herbert Hoover National Historic Site and restore stream function in Hoover Creek. Its purpose is to guide future actions by the National Park Service (NPS) in an effort to reduce the impacts of periodic high flows on cultural resources and historic structures, to restore the stream to a more historic appearance, and improve function of the stream. The final EIS assesses impacts that could result from continuation of current management or implementation of any of the four proposed action alternatives. Upon completion of the final SMP/EIS and decision-making process, one of the five alternatives will become the "Stream Management Plan" and guide actions in the stream corridor for the next 15 to 20 years.

Many of the historic resources within the historic site lie within the 50-, 25- and 15-year floodplains of Hoover Creek and the west branch of Wapsinonoc Creek. These structural resources and the archives contained therein are in jeopardy of damage or loss in the event of a flood. Although the park has developed a flood response plan and fitted many of the structures with protective measures, these measures would not adequately prevent damage from floods exceeding approximately a 2-year event.

Hoover Creek serves as the primary drainage for portions of the city of West Branch, where development has altered the hydrologic regimen. Changes in flow characteristics have adversely affected stream health and function. Physical changes to the stream have altered its appearance from the time of Herbert Hoover's childhood.

Five alternatives were considered to remedy these issues.

Alternative A, the No Action/Continue Current Management: No new management actions would be applied in the stream corridor. This alternative assumes that the existing management decisions would continue.

Alternative B, Provide 10-Year Flood Protection: This proposed management framework would include construction of a designed channel with increased flow capacity, remeandering of the stream course to better protect vital resources, stormwater management measures, and building-specific protective measures. Approximately 4.5 acres of the park would be disturbed during project implementation. This option would achieve approximately 10-year flood protection by adding site-specific actions at the Library-Museum.

Alternative C, Provide 15-Year Flood Protection: This option includes all the components of Alternative B, with additional building-specific measures to increase protection where needed.

Alternative D, Provide 25-Year Flood Protection: To provide protection from larger and more uncommon flood events, a storm water detention basin would be added to the elements of Alternative B. A detention basin with a capacity of approximately 67-acre-feet would be constructed within the park, in the upper reaches of Hoover Creek. Controlled release of flows and installation of waterproof door shields at the Visitor Center would provide protection during the 25-year storm event. This alternative would involve short-term disturbance of approximately 16.5 acres.

Alternative E, Provide 50-Year Flood Protection, the Preferred Alternative: As with Alternative D, a storm water detention basin would be constructed with a capacity of approximately 138-acre-feet and a total disturbance of about 18.5 acres. Protection from the 50-year flood event would be achieved with controlled flow release and installation of waterproof door shields to protect the Visitor Center.

The alternatives analyzed in this environmental impact statement would not result in major environmental impacts or impairment to park resources or values. Each of the alternatives would trade-off the temporary disturbances to the stream, soils, vegetation, and wildlife for long-term flood protection of historic and cultural resources and improved stream functions. The Preferred Alternative is consistent with National Park Service management policies and Herbert Hoover National Historic Site's general and resource management plans. Through development of a Programmatic Agreement between the National Park Service and the Iowa State Historic Preservation Office, proposals in the preferred alternative also are consistent with mandates of the National Historic Preservation Act of 1966 (as amended).

TABLE OF CONTENTS

Page

LIST OF TABLES

Title **Page**

LIST OF FIGURES

PURPOSE OF AND NEED FOR ACTION

INTRODUCTION

Herbert Hoover National Historic Site (the park) in West Branch, Iowa, was established on August 12, 1965. The historic buildings and grounds of this 187-acre site are preserved by the National Park Service (NPS) to commemorate the life of the 31st President of the United States. The historic, cultural and natural resources of the site include:

- the small cottage in which he was born in 1874 (Birthplace Cottage),
- the gravesites of President and Mrs. Hoover (Gravesite),
- the Friends Meetinghouse where the Hoover family worshipped,
- a blacksmith shop similar to the one owned by his father (Blacksmith Shop),
- the first West Branch one-room schoolhouse (Schoolhouse),
- a statue of the goddess Isis which was a gift from the people of Belgium (Isis Statue),
- various historic homes that represent the neighborhood,
- an 81-acre restored tallgrass prairie,
- an unnamed tributary to the west branch of Wapsinonoc Creek, and
- the Herbert Hoover Presidential Library-Museum (Library-Museum) managed by the National Archives and Records Administration.

The location of Herbert Hoover National Historic Site is shown in Figure 1.

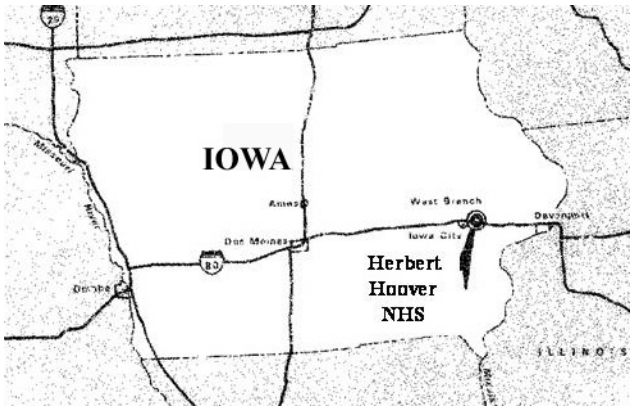

FIGURE 1. VICINITY MAP

The tributary of the west branch of Wapsinonoc Creek that runs through the National Historic Site has no official name, but is referred to as "Hoover Creek." Hoover Creek is subject to flash flooding, and the west branch of Wapsinonoc Creek can flood into the park during peak flows (NPS 2003a). In addition, the Hoover Creek stream channel is actively incising (deepening without substantial widening). This results in eroded and unstable stream banks and interferes with normal stream functions.

The park has developed this final stream management plan and environmental impact statement (SMP/EIS) to address issues related to the degradation of Hoover Creek and risks posed to historic structures and resources during flood events. Figure 2 shows several of the park's historic structures and the Library-Museum.

PURPOSE OF THE PLAN

The primary purposes are to:

- reduce the impacts of periodic high flows on cultural resources and historic structures,
- restore the stream to a more historic appearance, and
- restore functional characteristics of the stream.

NEED FOR THE PLAN

Many of the historic resources protected by the park lie within the 50-, 25- and 15-year floodplains of Hoover Creek and the west branch of Wapsinonoc Creek. This places them in jeopardy of damage or loss during flood events. In the 11-year period from 1991 through 2003, the park experienced 18 floods that inundated park buildings or infrastructure and interrupted services to visitors. In 1993 an event estimated to be a 35 year flood, flooded much of the park and threatened several historic structures (Figures 3 and 4).

Threats from floodwaters include accelerated deterioration of mortar foundations caused by water-logging, damage to collections and archival materials, mold and mildew growth from wet conditions, and damage to facility and maintenance equipment. In addition, the park must close during high water events, interrupting park operations and the visitor experience. In response to these flood threats, many of the historic structures have been fitted with drains to carry rainwater to the creek, sump pumps to empty water from foundations, and waterproof coatings on exterior surfaces. The park has also developed a flood response plan for evacuation of equipment from the maintenance facility in the event of high flows.

In addition to flood potential, there is concern that migration of the creek could damage the foundation of the Library-Museum, compromising the integrity of the building. Over the past two decades, several feet of southward lateral movement of the stream channel toward the building's foundation has been noted by park and Library-Museum staff. The distance from the foundation to the creek channel is now about 50 feet.

The appearance of Hoover Creek has also changed dramatically since the park was established. During much of President Hoover's life, the stream corridor appeared park-like, with grass-covered banks and scattered trees. The NPS wishes to return the park to a more historic appearance, which will enhance the historic setting and cultural landscape.

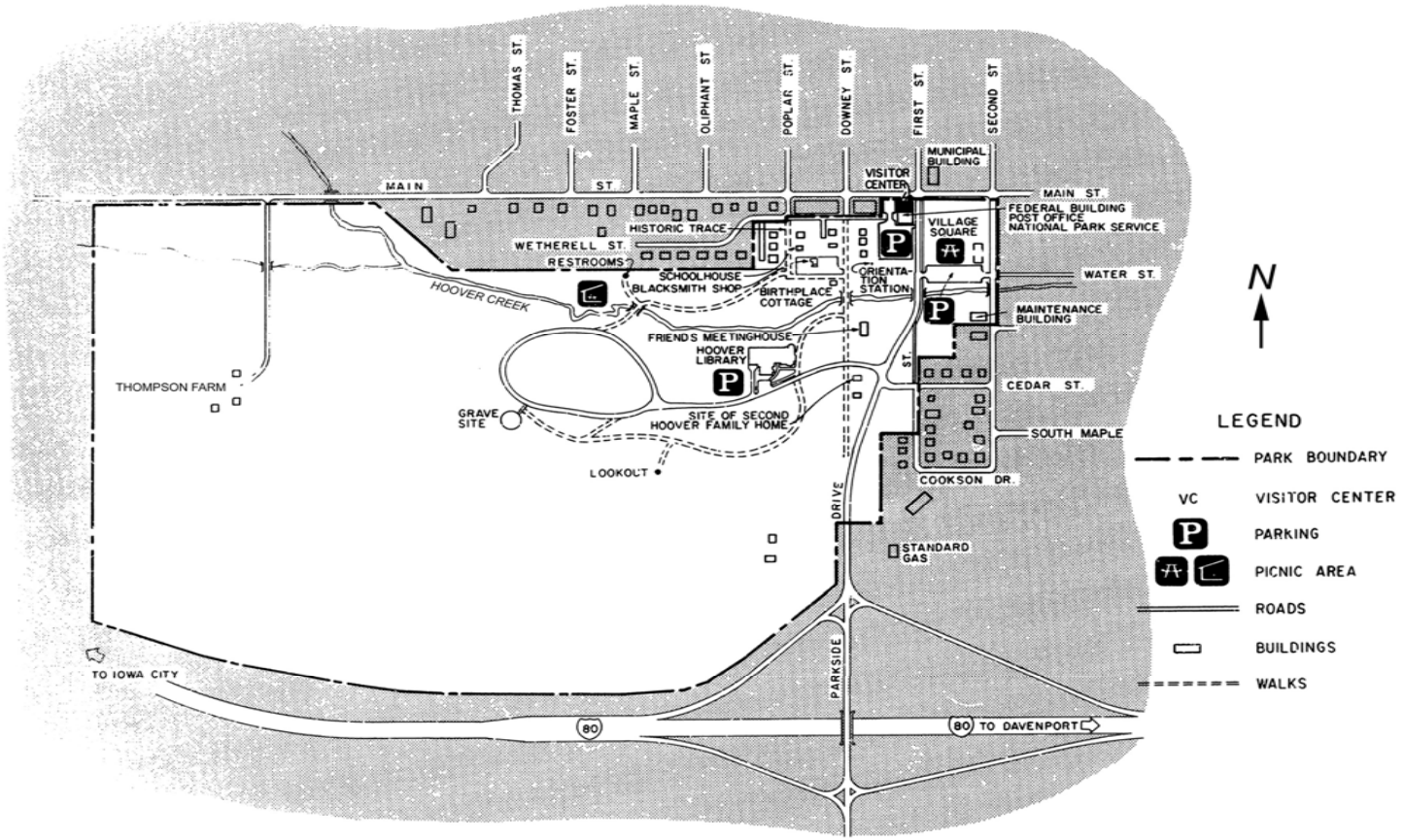

FIGURE 2. PARK MAP

During the 1993 flood, water nearly reached the foundation of the historic Friends Meetinghouse where the Hoover family worshipped.

Water in the Visitor Center parking lot and many other areas made these facilities unavailable for use by park visitors.

FIGURE 3. FLOOD OF 1993

The stream serves as the primary drainage for the western portions of the city of West Branch, where increased rural residential and urban development have altered the amount and rate of surface water runoff from native prairie conditions. Runoff from hard surfaces, such as roofs and parking lots, flows ten times faster than runoff from undeveloped land (Dunne and Leopold 1978). The high velocity of these flows allows them to carry greater sediment loads, which increases erosive power. Agricultural drainage tile installation in nearby fields occurred through the 1970s and is used extensively throughout the region. These underground drains divert drainage water from crop fields into surface water sources and increase the amount of runoff into the stream.

Within the park, drainage to Hoover Creek is primarily from impermeable surfaces such as parking areas, roads, sidewalks, and building roofs. Many of the park's historic structures have been fitted with sump pumps and drains that convey storm water directly to Hoover Creek. However, these in-park impervious areas are relatively small and are located in expanses of grass lawn. As a result, the contribution of the park to the total flow of Hoover Creek during and after a storm is relatively small.

Changes in flow characteristics have adversely affected the health and stream function of Hoover Creek. Over the past several decades, the stream channel has experienced slumping banks, continual erosion, down-cutting of the stream bed, and poor water quality from sedimentation and bacterial contamination upstream, possibly from agricultural lands and leaking septic tanks. Although bacterial content has been identified as an issue for Hoover Creek, this problem is not likely to be addressed by measures taken within the park. Implementation of a stream management plan may create some improvements to water quality. This would result from increased filtration through the riparian vegetation, and from longer detention of floodwater. The bacterial content of the water would be reduced by remaining in a detention basin, through the settling of sediment and the exposure to ultraviolet light that destroys indicator bacteria. Though these benefits would likely be detectable, this is not the focus of the plan.

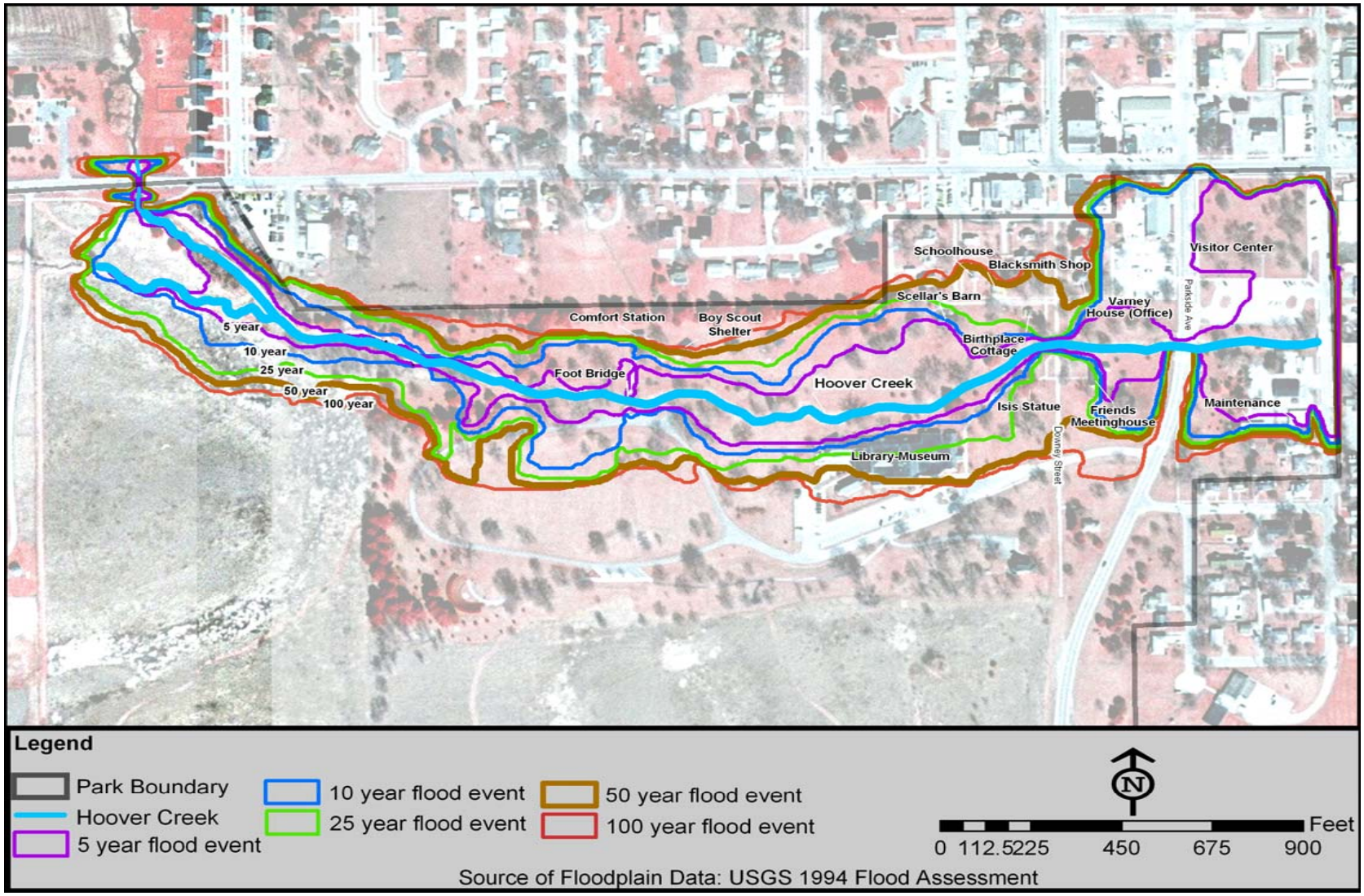

FIGURE 4. FLOODPLAIN MAP

STREAM MANAGEMENT OBJECTIVES

Objectives

Objectives are specific statements of purpose and describe what must be accomplished to a large degree for the action to be considered a success. The following objectives were developed to guide the preparation of this final SMP/EIS.

- Reduce flood threat and flood damage to historic structures and other cultural resources.
- Reduce the frequency at which flood events occur within the park by increasing stream flow capacity.
- Stabilize banks and reduce entrenchment and lateral cutting of the stream.
- Enhance the commemorative character of the park by returning the stream corridor to a more historic appearance.
- Implement modern, sustainable riparian management techniques.
- Provide safe, stable stream banks from which visitors can observe the stream and riparian area.

DESCRIPTION OF THE PROJECT AREA

Herbert Hoover National Historic Site encompasses 187 acres and is located in West Branch, Iowa, 10 miles east of Iowa City. The primary historic and cultural resources of the park include a historic district containing several late-nineteenth and early-twentieth century houses and buildings, and the gravesite of President Herbert Hoover and his wife, Lou Henry Hoover. Additional resources include Hoover Creek, Isaac Miles Farm, 81-acre reconstructed tallgrass prairie, Thompson Farm, Village Green, maintenance facility, Visitor Center, picnic areas, parking areas, and open space.

Hoover Creek forms within the park, as two small tributaries entering from the north and west flow together near the park's northwestern boundary. The creek then flows to the east through the heart of the park and exits the park upstream of its confluence with the west branch of Wapsinonoc Creek. The project area for the final SMP/EIS includes the length of the Hoover Creek stream corridor through the park, its associated riparian unit, and the northwest portion of the park in the vicinity of the tributaries and their confluence. The riparian unit surrounding the creek encompasses approximately 5 acres and is composed of prairie, woodland, and maintained grass (NPS 2004a).

The park has delineated four distinct stream management units along Hoover Creek: Prairie, Recreation, Historic Core, and Village Green (Figure 5). The different reaches of the creek have unofficially served as distinct units for various interpretive themes since 1970 (NPS 2003a). The stream management units described below refer to areas in the immediate vicinity of Hoover Creek.

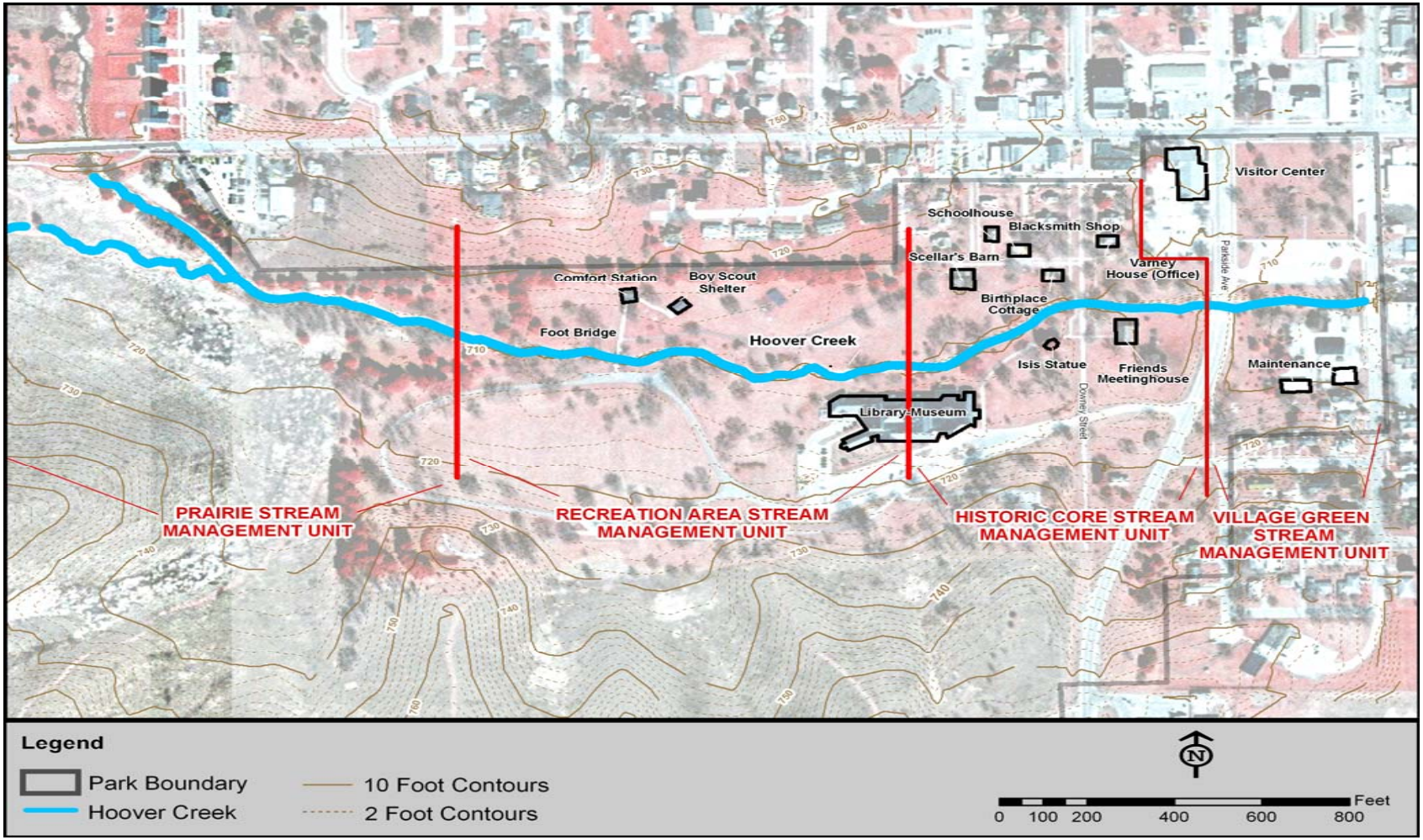

FIGURE 5. STREAM MANAGEMENT UNITS

Prairie Stream Management Unit

Located in the northwest area of the park, this is where two drainages converge to form Hoover Creek. This reach extends downstream, through the tallgrass prairie and wooded areas, joining the Recreation Stream Management Unit about 375 feet west of the pedestrian bridge. Pathways are maintained along the stream bank. These mowed trails provide access to the prairie perimeter trail on the western side of the park, and to the city sidewalk to the north.

There are no structures located in this reach. This stream unit is visible from Main Street when entering West Branch from the west, but it is not highly visible from other locations within the park due to dense vegetation in the stream corridor.

The stream reach in this unit is generally in degraded condition with banks incised and evidence of active bank slumping and erosion. The stream bed and channel bottom are approximately 9 feet below the top of the stream bank (Figure 6).

FIGURE 6. HOOVER CREEK IN THE PRAIRIE STREAM MANAGEMENT UNIT

Recreation Stream Management Unit

This unit (Figure 7) extends from about 375 feet west of the pedestrian bridge eastward to the Library-Museum. A portion of the Library-Museum is included in this unit. Visitors use this area for picnicking and walkers/joggers use the loop road and trails. The landscape is a suburban park setting of mowed Kentucky bluegrass and shade trees. This reach of the creek

runs behind the Library-Museum, passes through a highly visible area of the park, and can be seen from the Gravesite - Birthplace Cottage vista.

A visual corridor that extends between the Birthplace Cottage and the Gravesite forms a significant element of the cultural landscape. Facilities near this area include two covered picnic facilities, a comfort station, and an asphalt-surfaced walking trail leading upstream from the Historic Core Stream Management Unit to the pedestrian bridge.

As in the Prairie Unit, the stream condition classification for this unit shows a very high sensitivity to disturbance with poor recovery potential. The high sediment supply from the channel or adjacent slopes is indicative of the high erosion potential. This reach is influenced greatly by vegetation, meaning that there is a direct correlation between changes in composition, vigor, and density of vegetation and changes in the appearance and stability of the stream.

FIGURE 7. HOOVER CREEK IN THE RECREATION STREAM MANAGEMENT UNIT

Historic Core Stream Management Unit

This unit (Figure 8) reaches through the heart of the park's cultural resources, from the Library-Museum site to east of the Friends Meetinghouse. This reach of the creek is the most critical to maintaining the commemorative theme of the park. The landscape is primarily mowed lawn, with sparse tree cover. The appearance is open, park-like, and formal. This stream unit is adjacent to many of the park's primary historic structures. This portion of the park is the most visited by out-of-town visitors and is important in conveying the story of

Herbert Hoover's childhood. The view from the Birthplace Cottage to the Gravesite stretches across this unit, and this visual connection must be maintained.

The creek also plays an important role in the view of the Isis Statue and the Friends Meetinghouse. This unit is bounded on the west by Scellar's Barn and on the east by Parkside Drive bridge. The cultural resources adjacent to this stream unit include Scellar's Barn, Birthplace Cottage, a portion of the Library-Museum, Isis Statue, and Friends Meetinghouse. The historic structures along Downey Street are also included in this unit.

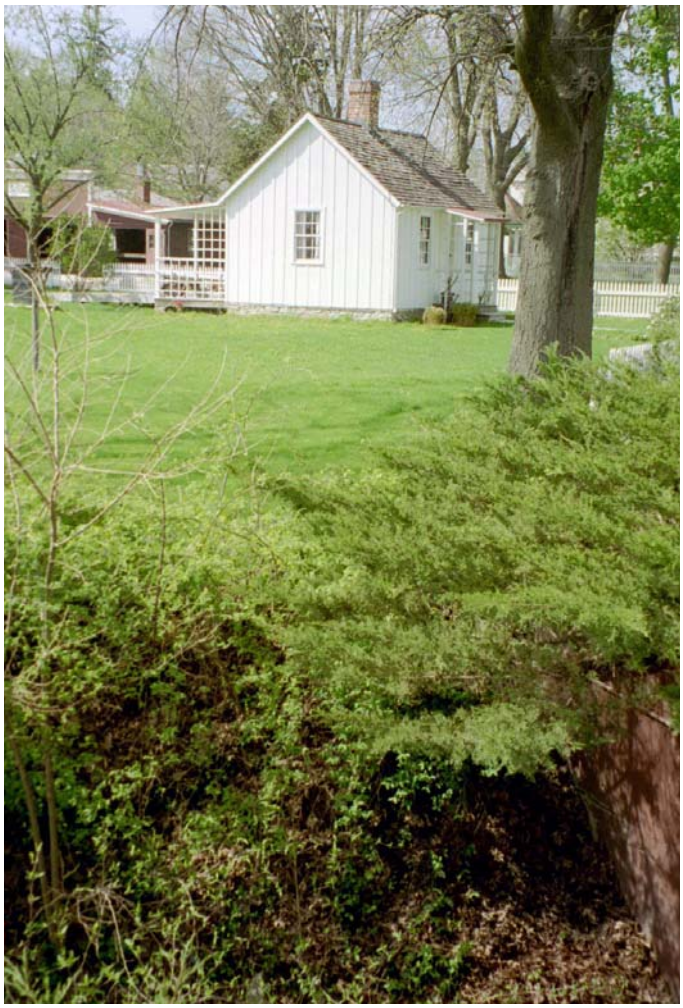

FIGURE 8. HOOVER CREEK BANK AND THE BIRTHPLACE COTTAGE IN THE HISTORIC CORE STREAM MANAGEMENT UNIT

The stream condition classification for this unit shows that the location has a very high sensitivity to disturbance, fair recovery potential, high sediment supply, very high potential for stream bank erosion, and is moderately influenced by the presence of vegetation.

Village Green Stream Management Unit

This section of the creek is located at the easternmost border of the park and is closest to the confluence with the west branch of Wapsinonoc Creek (see Figure 9). To the north of the creek, east of the Downey Street Bridge, and west of Parkside Drive, facilities include the Visitor Center and the main parking area. East of Parkside Drive and north of the creek is the auxiliary parking area and the Village Green. South of the creek, also east of Parkside Drive, is the park maintenance facility, including storage for materials and equipment.

This reach of the stream is within view of the Friends Meetinghouse and the most heavily used roads in the community. During the warm summer months, much of this unit is hidden from view by dense vegetation in the creek corridor. Due to its proximity, this area is the most affected by backwater from the west branch of Wapsinonoc Creek.

As in the Historic Core Unit, the stream condition classification for this unit shows that it has a very high sensitivity to disturbance, fair recovery potential, high sediment supply, very high potential for stream bank erosion, and is moderately influenced by the presence of vegetation.

This stream reach has the most frequent flood occurrence, which largely results from backwater from the west branch of Wapsinonoc Creek. The stream channel is deeply incised with depths to the channel floor ranging from 7 to 9 feet, and a bank-to-bank width of less than 30 feet. Vegetation is so dense near the maintenance facility that the stream is not visible from the bridge during the summer months.

BACKGROUND

History of Hoover Creek

Geomorphologists and other experts believe that historically, creeks such as the Wapsinonoc were fed by linear sloughs and swamps. The Hoover Creek main channel was reportedly a grassy swale prior to, and for some time after, settlement of the area. Soils consisted of a spongy loam, capable of excellent water retention. The historic conditions resulted in a groundwater hydrologic system with few defined surface water drainages. Early settlers removed most of the trees along local creek channels shortly after their arrival for use as building materials and fuel. A second wave of immigrants that arrived in the 1880s led to extensive farming of the prairie and installation of agricultural drainage tiles. These changes altered the hydrology of the watersheds, including the Hoover Creek drainage. Precipitation ran off the agricultural fields far more rapidly than from the native tallgrass prairie. The high-volume, high-velocity flows incised the natural swamps and sloughs into narrow, steep-sided channels. What were once ephemeral drainages gradually became perennial streams. As development proceeded, the timing and duration of flows continued to change. Stream banks became unstable, often collapsing, and channels widened to convey increased volumes of water from the landscape to local rivers (NPS 2004b).

Approximately 250 acres of urbanization occurred in the Hoover Creek watershed between 1940 and 2003. These land use changes continued to alter the hydrology from the ground-water based system to one consisting primarily of surface water morphology, by reducing

infiltration and increasing runoff. An additional 168 acres of urban development upstream of the site is anticipated in the near future (Doermann pers. comm. 2004).

FIGURE 9. HOOVER CREEK BANK IN THE VILLAGE GREEN STREAM MANAGEMENT UNIT

Hoover Creek has a base flow of about 3 cubic feet per second (cfs) and drains approximately 1,700 acres (2.7 square miles) of agricultural fields, residential land, and a golf course. Hoover Creek joins the west branch of Wapsinonoc Creek just east of the park boundary (NPS 2004a). Flood history suggests that Hoover Creek has exceeded its banks 18 times in 11 years. This flood frequency is considered rare and corresponds to years of unusually high precipitation. During these events, the maintenance facility was affected by backwater from the west branch of Wapsinonoc Creek, with historic resources being threatened by the higher magnitude flows (see Figure 3). Data were collected for floods in 1960, 1967, and 1993. The floods of 1967 and 1993 appear to be the largest flood events in recent history (NPS 2003a).

The west branch of the Wapsinonoc is not gauged, and no stream flow data are available. It is a perennial stream, which drains a watershed of about 3,000 acres (4.7 square miles), and

thus has higher flow volumes than those found in Hoover Creek. Its watershed lies immediately to the east and north of the Hoover Creek watershed, and comprises agricultural lands, the eastern portions of the city of West Branch, and areas of residential development. The west branch of Wapsinonoc Creek has been subjected to similar watershed development and flow change conditions as described for Hoover Creek.

Within the past decade, agricultural practices have changed to include reduced tillage and increased maintenance of vegetative ground covers to protect the soil. These practices have probably reduced runoff from agricultural lands in the Hoover Creek drainage, although no studies have been performed to document the occurrence or magnitude of changes. Reductions in runoff from agricultural lands upstream from the park probably have been offset by runoff increases associated with continued conversion of lands to residential and urban uses.

Hoover Creek is now deeply incised and has a higher-than-historical frequency and magnitude of flooding. Other adverse effects associated with changes in runoff in the watershed have included scouring of the stream bed, repeated undermining and collapse of stream banks, and migration of the stream channel to within 50 feet of the Library-Museum (see Figure 10).

FIGURE 10. CURRENT CREEK CONDITIONS NEAR THE LIBRARY-MUSEUM

Previous Studies

As a result of the park's history with flash flooding, several flood analyses have been conducted by the NPS and the U.S. Geological Survey (USGS). These studies were performed primarily for the purposes of determining flood damage effects, estimating channel capacity and flood frequency of Hoover Creek, and identifying park facilities most vulnerable to flooding.

NPS Water Resources Division 1993 Flood Assessment

Following the 1993 flood of Hoover Creek, the NPS Water Resources Division performed a flood effects assessment. The assessment stated that "floods will be a constant, and perhaps

increasingly frequent, threat in the area until such time as mass-runoff control structures and other remediations are developed or installed in the drainage" (NPS 1993). The study recommended:

- removing trees along the west branch of Wapsinonoc Creek to provide a more open floodway and reduce turbulence in water flow;
- removing obstructions in the stream channel upstream from the bridges;
- relocating the park maintenance facility and equipment to sites outside the floodplain;
- installing perimeter drain systems around the Friends Meetinghouse; and
- decreasing the angle of the stream banks, seeding stream banks with native vegetation, and installing flood impoundment structures to reduce peak flow rates and allow slower release of water during flood events (NPS 1993).

The study noted that the Library-Museum was close to some tight, well-forested meanders, and it recommended that consideration be given to modifying the stream in this area (NPS 1993).

The study also stated that the major causes of the rising crest of flood events are modern development, agriculture, and constriction of the stream channel upstream (NPS 1993). To reduce the rapid runoff problem, it was recommended that the NPS work collaboratively with other groups such as the Natural Resources Conservation Service, the local soil conservation district, and the city of West Branch (NPS 1993).

USGS 1994 Flood Assessment

Flood analyses were also conducted by the NPS Water Resources Division and the USGS following the flood of 1993. The work assessed the frequent flooding of Hoover Creek and estimated the channel capacity to be 650 cfs. This flow volume represented the discharge from a flood with an expected recurrence frequency of 2 to 5 years (USGS 1994).

The risk of floodwater making contact with the first floor elevations of buildings in the park was found to be highest for the maintenance building (office and shop) and lowest for the Birthplace Cottage and Library-Museum. The maintenance facility is at risk due to backwater ponding from the west branch of Wapsinonoc Creek, rather than from flows in Hoover Creek (USGS 1994).

2004 Hydrology and Hydraulics Studies Used to Develop the Stream Management Plan

An engineering report prepared by Parsons, Inc. in 2004 expanded on the USGS models (NPS 2004b). This study accounted for runoff volumes and peak flow rates. It also performed qualitative and quantitative geomorphologic assessments that described the instability of the current system and its primary causes.

The study reported that the channel of Hoover Creek is incising and stream flow rates (rates and volumes of discharge) have increased. This is most likely the result of urbanization having first occurred in the Wapsinonoc Creek watershed, resulting in degradation of its bed and dropping the geomorphic platform (base) level at the confluence with Hoover Creek. This new base level, combined with increased runoff due to development upstream of the park, resulted in rapid erosion and subsequent incision of the Hoover Creek channel. This

process of down-cutting of the flow line in Hoover Creek causes sloughing of the banks with undercutting and mass wasting of bank materials.

Incision in any stream causes separation of the main channel from and loss of function of the floodplain. It also causes loss of meanders (the natural sinuosity of mature stream channels), undercutting of banks, undercutting of bridge supports, unsafe vertical banks, and in some cases, water table declines that can impact riparian wetlands. Further, this process is not self-corrective, and lateral instabilities are evident and will continue to damage the creek banks and threaten historic resources.

Additional hydrologic and hydraulic modeling was conducted to determine the instability effects that have resulted from conversion of the watershed from native prairie to agricultural and urban uses. The U.S Army Corps of Engineers Hydrologic Engineering Center River Analysis System (HEC-RAS) model was used to compare the existing hydrologic conditions to those of native prairie and urban development conditions and incorporated the following assumptions:

- The watershed was mostly native prairie before the changes in land use during the late 19th century.
- Currently, approximately 15 percent of the land in the Hoover Creek watershed is used for residential and urban purposes.
- In the future, 25 percent of the Hoover Creek drainage would consist of residential and urban development.
- Future development would include mitigation of storm water flows (installation of detention basins and structures) by reducing the developed 100-year flow to the 5-year undeveloped flow (City of West Branch Resolution 543 dated 10/19/1998).

The HEC-1 model is designed to simulate the surface runoff response of a river basin to precipitation by representing the basin as an interconnected system of hydrologic and hydraulic components and was used to develop runoff hydrographs.

Table 1 shows the modeled peak flow values for Hoover Creek during storm events of various return periods. Under the future development scenario, flows in the creek are expected to decrease by about two percent compared to existing conditions for all of the storm event return periods. This decrease would result from implementation of the city of West Branch's 1998 storm water management policy. All new development must mitigate flows from the 100-year precipitation event to match flows generated by a 5-year event. As development in the watershed increases, a greater area of the watershed would be subject to this policy, and peak flows would gradually diminish.

Hydraulic modeling of Hoover Creek using a HEC-RAS model and the revised peak flow values was performed to develop water surface profiles. The water surface profiles show the elevations, in feet above sea level, that various flows reach during high water events. These elevations were used to generate floodplain maps.

TABLE 1: MODELED PEAK FLOWS AT THE MOUTH OF HOOVER CREEK FOR VARIOUS RETURN PERIODS

Storm Return Period	Existing Condition	Future Development Condition
100 years	2,053 cfs [a/]	1,981 cfs
50 years	1,720 cfs	1,659 cfs
25 years	1,501 cfs	1,446 cfs
10 years	1,204 cfs	1,159 cfs
5 years	994 cfs	956 cfs

a/ cfs = cubic feet per second.

Modeling results showed that under existing conditions the upstream reaches of Hoover Creek have an average channel velocity of 5.60 feet per second, explaining the severity of bank erosion. The average channel velocity in downstream reaches is considerably lower, 0.61 feet per second, as a result of backwater from the confluence with the west branch of Wapsinonoc Creek (NPS 2004b).

Past Stream Management Efforts

The park has been dealing with stream management issues for several years and has taken the following individual actions to address some of the issues:

- A historic brick and mortar retaining wall was installed in the late 1930s along the stream bank near the Downey Street Bridge for the purpose of retarding erosion. Sections of the wall have failed and fallen into the stream channel.
- Various storm water management improvements, such as installation of sump pumps and drain pipes/structures, were implemented over the years to attempt to mitigate flooding and drainage problems.
- Gabions were installed prior to 1991 along the flood-prone maintenance yard to stabilize the stream bank. These are now covered with vegetation or have failed and fallen into the stream channel.
- Prairie species were seeded in areas where the bank was sloughing in the mid-1990s. Upstream reaches near the confluence now support native prairie species and non-natives such as smooth brome grass and Siberian elm.
- The pedestrian bridge by the picnic shelters was replaced in 1994 following the 1993 flood. The elevation of the new bridge was raised using fill. The bridge remains stable and accessible even in bankfull flow conditions.
- Toe hardening, seeding, and erosion cover were implemented immediately east of the pedestrian bridge by the picnic area in 2000. The rip rap was used to create a pool for the stage gauge and secondarily to stabilize the toe of the bank in a highly erosive area next to the gauge. The rip rap at this site rests in the bottom of the stream channel (see Figure 11).

FIGURE 11. FAILED RIP RAP IN STREAM CHANNEL EAST OF PEDESTRIAN BRIDGE

RELATED LAWS, POLICIES, PLANS, AND CONSTRAINTS

The following laws, policies, and plans are described in this section to show the constraints this final SMP/EIS must operate under and the goals and policies that it must meet. Overarching goals and constraints are summarized in this section, and more detailed descriptions of related laws and policies pertinent to specific impact topics are provided in Appendix D.

NPS Guiding Laws and Policies

NPS Organic Act of 1916

Congress directed the U.S. Department of the Interior and the NPS to manage parks "to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations" (16 United States Code [USC] § 1). Congress reiterated this mandate in the Redwood National Park Expansion Act of 1978 by stating that the NPS must conduct its actions in a manner that will ensure no "derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress" (16 USC § 1 a-1).

Despite these mandates, the Organic Act and its amendments afford the NPS latitude when making resource decisions that balance visitor recreation and resource preservation. By these acts, Congress "empowered [the NPS] with the authority to determine what uses of park resources are proper and what proportion of the park resources are available for each use" (*Bicycle Trails Council of Marin v. Babbitt,* 82 F.3d 1445, 1453 [9th Circuit 1996]).

Courts consistently interpret the Organic Act and its amendments to elevate resource conservation above visitor recreation. *Michigan United Conservation Clubs v. Lujan,* 949 F.2d 202, 206 (6th Circuit 1991) states, "Congress placed specific emphasis on conservation." The *National Rifle Association of America v. Potter,* 628 Federal Supplement 903, 909 (D.D.C. 1986) states, "In the Organic Act Congress speaks of but a single purpose, namely, conservation." NPS *Management Policies 2001* also recognizes that resource conservation takes precedence over visitor recreation. Section 1.4.3 dictates that "when there

is a conflict between conserving resources and values and providing for enjoyment of them, conservation is to be predominant" (NPS 2000a).

Because conservation remains predominant, the NPS seeks to avoid or to minimize adverse impacts on park resources and values, though they may allow negative impacts when necessary to fulfill park purposes, as long as the impact does not constitute impairment of the affected resources and values (NPS 2000a). That discretion to allow certain impacts within the park is limited by statutory requirement that the NPS must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. An action constitutes an impairment when its impacts "harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values" (NPS 2000a). An adverse impact constitutes impairment to the extent that it has a major adverse effect on a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park,
- key to the natural or cultural integrity of the park, or
- identified as a goal in the park's general management plan or other relevant NPS planning documents.

To determine impairment, the NPS must evaluate "the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts" (NPS 2000a). This final SMP/EIS, therefore, assesses the effects of the stream management alternatives on park resources and values and determines if these effects would cause impairment.

NPS Management Policies 2001

Several sections from NPS *Management Policies 2001* (NPS 2000a) and accompanying guidance are relevant to stream management and protection of cultural resources in Herbert Hoover National Historic Site, as described below.

The NPS cultural resource program involves stewardship to ensure that cultural resources are preserved and protected, receive appropriate treatments (including maintenance), and are made available for public understanding and enjoyment. Section 5 of the policies and reiterated in Director's Order (DO) 28, *Cultural Resources Management*, park units are instructed "to employ the most effective concepts, techniques, and equipment to protect cultural resources against theft, fire, vandalism, overuse, deterioration, environmental impacts, and other threats, without compromising the integrity of the resources" (NPS 2000b).

Section 4.1.5 offers guidance to parks for dealing with impacts to natural systems resulting from human disturbances, such as the introduction of exotic species; contamination of air, water, and soil; changes to hydrologic patterns and sediment transport; the acceleration of erosion and sedimentation; and the disruption of natural processes. The NPS "will seek to return human-disturbed areas to the natural conditions and processes characteristic of the ecological unit in which the damaged resources are situated" (NPS 2000a).

NPS floodplain policy is articulated in Section 4.6.4. The NPS has developed guidelines in DO 77-2, *Floodplain Management*, that specifically state that the NPS will:

- protect, preserve, and restore the natural resources and functions of floodplains;
- avoid the long- and short-term environmental effects associated with the occupancy and modifications of floodplains;
- avoid direct or indirect support of floodplain development and actions that could adversely affect the natural resources and functions of floodplains or increase flood risks; and
- restore, when practicable, natural floodplain values previously affected by land use activities within floodplains (NPS 2003c).

NPS Special Directive 93-4 articulates the agency-specific guidance for floodplain management, as required by Executive Order 11988, *Floodplain Management*. In this directive, the process is set forth for proposed actions to be classified in one of three action classes, which then determines what "regulatory floodplain" (100-year, 50-year, or extreme) applies. Flood conditions and hazards must be quantified as a basis for management decision making, and a formal statement of findings may be required.

Director's Order 12: Conservation Planning, Environmental Impact Analysis, and Decision Making and Handbook

DO 12 lays the groundwork for how the NPS complies with the National Environmental Policy Act (NEPA) and sets forth a planning process for incorporating scientific and technical information and establishing a solid administrative record for NPS projects.

DO 12 requires that impacts on park resources be analyzed in terms of their context, duration, and intensity. It is crucial for the public and decision makers to understand the implications of those impacts in the short and long term, cumulatively, and within context, based on an understanding and interpretation by resource professionals and specialists. It also requires that an analysis of impairment of park resources and values be made as part of the NEPA document.

Herbert Hoover National Historic Site, Enabling Legislation

Each NPS unit is guided by the Organic Act, NEPA, and other laws and policies, but each unit also has more specific guidance provided by its own enabling legislation; statements of mission, purpose, and significance; and broad planning documents such as a general management plan and strategic plan.

The park's enabling legislation was authorized through Public Law 89-119 (79 Stat. 510; 16 United States Code [USC] 1 et seq.; 16 USC 461-467) on August 12, 1965. Congress authorized the acquisition and development of lands in West Branch, Iowa by the NPS (including those lands formerly owned by the General Services Administration). Congress stipulated that the site was to "preserve in public ownership historically significant properties associated with the life of Herbert Hoover." The Omnibus Act, Public Law 92-272 (86 Stat. 120; April 11, 1972), authorized an increase in the development and land-acquisition ceilings of the site, up to $3,500,000. The site was established on August 17, 1972 (NPS 2004a).

Purpose and Significance of Herbert Hoover National Historic Site

National park system units are established to fulfill specific purposes, based on the unit's unique and "significant" resources. A unit's purpose, as derived from its enabling legislation, is the foundation on which later management decisions are based to conserve resources while providing "for the enjoyment of future generations."

As stated in the general management plan (NPS 2004a), the park's purpose is to:

- Preserve the Birthplace Cottage, Gravesite, and other historically significant properties associated with the life of Herbert Hoover;
- Provide an accessible, dignified, and spacious setting in which visitors can experience the Birthplace Cottage, Gravesite, Library-Museum, and other resources; and
- Commemorate and interpret the life, career, and accomplishments of Herbert Hoover in cooperation with other organizations.

Herbert Hoover National Historic Site is significant because:

- It is the birthplace and site of the formative years that set Herbert Hoover on the road to becoming the nation's 31st President and a global humanitarian.
- From his birth to age 11, Herbert Hoover's experiences and associations with his family and the community of West Branch influenced his personality, work ethic, spiritual and moral character, and ambition. These strong traits are evident throughout his public service and private endeavors.
- It memorializes Herbert Hoover by encompassing the Birthplace Cottage, Gravesite, Library-Museum, Friends Meetinghouse, Blacksmith Shop, Schoolhouse, Isis Statue, tallgrass prairie, and Hoover Creek in a dignified setting.
- The involvement of Herbert and Lou Henry Hoover, their family, friends, and the community was a driving force for the establishment, design, and management of the park. In this spirit of cooperation, the NPS facilitates the stewardship of this commemorative site.

The mission statement for the park, as stated in the general management plan, is to preserve, protect, and interpret for present and future generations the cultural and natural resources associated with the life of Herbert Hoover in West Branch, Iowa.

Other Relevant Federal Laws and Policies

National Historic Preservation Act of 1966, as Amended

The goal of the National Historic Preservation Act (NHPA) (16 USC 470) is to have federal agencies act as responsible stewards of our nation's resources when their actions affect historic properties. The NHPA is the largest piece of federal historic preservation legislation. It has two major components that affect the responsibilities of federal agencies: First, under section 106, federal agencies are to consider the effects of their undertakings (including the issuance of permits, federal projects, and the expenditure of federal funding) on historic resources that are either eligible for listing or are listed in the National Register of Historic Places. The National Register is an inventory of United States historic properties, including prehistoric resources, at the national, state, or local level and is maintained by the NPS. The

inventory includes buildings, structures, objects, sites, districts, and archeological resources. Section 110 imposes another obligation on federal agencies that own or control historic resources. Under this section, federal agencies must consider historic preservation of historic resources as part of their management responsibilities.

The NHPA created the Advisory Council on Historic Preservation, an independent federal agency, to advise the president and Congress on matters involving historic preservation. The Council is authorized to review and comment on federal undertakings that will have an effect on properties listed in the National Register of Historic Places, or properties eligible for such listing.

Executive Order 11988, Floodplain Management

Executive Order 11988 mandates all federal agencies to develop agency-specific guidance, provide leadership, and take action to:

- reduce the risk of flood loss;
- minimize the impact of floods on human safety, health, and welfare; and
- restore and preserve the natural and beneficial values served by floodplains.

Related Planning Documents for Herbert Hoover National Historic Site

General Management Plan

The park's general management plan maintains that the NPS will manage resources to provide a natural setting to support the commemorative emphasis of the site. This plan was completed in 2004 and includes prescriptions for managing the stream management units, as well as protecting historic resources and enhancing visitor understanding and appreciation. The stream is the major landscape feature transecting the park. Its appearance as it passes through the National Historic Site must be consistent with the individual park Management Zones through which it passes. As responsible stewards, the NPS will manage resources to a level that meets all applicable laws, policies, and NPS standards.

Cultural Landscape Report

The 1995 cultural landscape report identified the significant characteristics and features of the landscape as expressed in the physical materials of the site (roads, buildings, walls, streams, and vegetation), by their relation to one another, and by the ways in which their use reflected cultural values and traditions through time. The report reviewed the history of the site and the corresponding type and degree of landscape change because management of an appropriate level of change in a cultural landscape is closely related to its significance. Changes in the landscape may diminish its integrity or may be essential to the continuation of a pattern of use that has evolved through time. Having identified the significant character-defining features of the park, the changes in the landscape through time, and the period of significance, the cultural landscape report made recommendations for future landscape management. In 2005, a cultural landscape inventory was developed to provide a comprehensive inventory of all the historically significant landscapes within the park (NPS 2005b).

The general management plan cites the cultural landscape report as a guide to achieve stated desired conditions for landscape elements.

Flood Emergency Plan

The park's flood emergency plan, written in the 1970s, is being updated in conjunction with implementation of this stream management plan. Although this is outside the scope of the stream management plan effort, revisiting the emergency procedures in conjunction with this action would improve protection of historic resources and provide for enhanced operational efficiency.

SCOPING PROCESS AND PUBLIC PARTICIPATION

Scoping Activities

Scoping is the effort to involve agencies and the general public in determining the issues to be addressed in the environmental evaluation. Among other tasks, scoping determines important issues and eliminates unimportant issues; allocates assignments among the interdisciplinary team members and other participating agencies; identifies related projects and associated documents; and identifies other permits, surveys, or consultations required by other agencies. Scoping includes early input from any interested agency or any agency with jurisdiction by law or expertise.

Internal scoping for the project to develop a stream management plan began in April 2004 with a meeting of NPS planning staff. This initial meeting was conducted to identify interdisciplinary team members, assign roles and responsibilities, identify agencies to be consulted, review background information and previous studies, and initiate development of the project purpose, need, and objectives.

The public scoping process began on August 3, 2004, with the publication in the *Federal Register* (Federal Register, Vol. 69, No. 148) of a Notice of Intent to prepare an EIS. Two public scoping meetings were held at the park on August 12, 2004, where the park staff presented information about the project and collected public comments related to the scope and range of issues on the desired future condition of the stream and issues that should be considered during the planning process. A total of 16 people attended the meetings. The park continued to take comments from the public by telephone, e-mail, or letter until September 30, 2004. The planning team used the public comments and agency input to develop the four stream management action alternatives evaluated in this final SMP/EIS.

Agency Consultation

During the initial scoping phases of this final SMP/EIS, on June 22, 2004, the NPS contacted the State Historic Preservation Officer, U.S. Fish and Wildlife Service, U.S. Geological Survey, U.S. Army Corps of Engineers (Rock Island District), Iowa Department of Natural Resources, and the NPS Water Resources Division. Detailed information on agencies consulted and their involvement in the project is included in "Consultation and Coordination" (Chapter 5). Copies of correspondence letters are included in Appendix A.

ISSUES AND IMPACT TOPICS

Issues are problems, opportunities, and concerns regarding the current and potential future management of Hoover Creek. Issues were identified by NPS, other federal agencies, state agencies, and the public throughout the public scoping process.

Impact topics are derived from issues and focus the planning process and the assessment of potential consequences of the alternatives. *DO 12 and Handbook* (NPS 2001) lists impact topics that must be considered, based on the requirements in such sources as federal legislation, executive orders, and the Council on Environmental Quality (CEQ) guidelines for implementing NEPA. Other impact topics are identified based on region- or park-specific concerns, or as a result of scoping. The relevant current conditions of impact topics are discussed in detail in "Affected Environment" (Chapter 3). Impacts associated with each of the stream management alternatives are described in "Environmental Consequences" (Chapter 4).

Impact Topics Retained for Analysis

Table 2 presents a summary of issues that are considered to be important by the technical experts on the interdisciplinary team to be further analyzed in this final SMP/EIS. It should also be noted that the Water Resources topic includes the analysis of floodplain structure and function.

TABLE 2: ISSUES TO BE EVALUATED AND CORRESPONDING IMPACT TOPICS

Issue	Impact Topics
In its current configuration, the stream potentially threatens historic properties, including structures, collections, and cultural landscape features.	Cultural Resources, Visitor Understanding and Appreciation
Flooding could result in the total loss of the historical wall at the Downey Street Bridge.	Cultural Resources
Project implementation actions could result in short-term changes to the cultural landscape.	Cultural Resources
The stabilization of the stream bed could disrupt the pioneer-era archeological sites along Hoover Creek.	Cultural Resources
The viewshed between the Birthplace Cottage and the Gravesite must be maintained. The continuation of the eroding stream bed and potential management techniques could affect this cultural landscape.	Cultural Resources, Visitor Understanding and Appreciation
The stream frequently inundates park infrastructure, such as the maintenance facility, causing disruption in park operations.	Park Operations
The gradual grading of the stream bed to stabilize the soil could encourage people to approach the water. Water quality in the stream is not safe for human contact because of bacterial contamination.	Public Health and Safety
The incising stream bed creates a hazard of fall and injury associated with steep six- to eight-foot-high slopes in some areas.	Public Health and Safety

TABLE 2: ISSUES TO BE EVALUATED AND CORRESPONDING IMPACT TOPICS (CONT)

Issue	Impact Topics
Vegetation along the stream corridor should be replaced with a seed mix that will appear natural, while still being compatible with the cultural landscape.	Vegetation, Visitor Understanding and Appreciation, Cultural Resources
Project implementation activities could temporarily affect the visitor experience.	Visitor Understanding and Appreciation
The stabilization of Hoover Creek could create impacts on the natural ambience of the riparian area; it should not look artificial or intrusive and should maximize the use of low-impact and low-maintenance methods.	Visitor Understanding and Appreciation, Park Operations
Hoover Creek does not function as a healthy stream; it experiences high rates of erosion and incision, and lateral migration is suspected.	Water Resources
Parking lot runoff from several locations in the park is directed into the creek where it adds to the pollutant load.	Water Resources
Project implementation activities could potentially affect the water quality of the stream.	Water Resources
The stream does not have a healthy riparian buffer or support native aquatic populations.	Water Resources, Wildlife
The incising stream bed is leading to the loss of vegetation that supports wildlife and anchors the riparian area.	Water Resources, Wildlife, Vegetation, Soils
Stream management activities should consider creating habitat that would foster the increased presence of wildlife in the area.	Wildlife
The construction activities during stabilization of the stream bed could temporarily displace wildlife and destroy existing vegetation.	Wildlife, Vegetation

Impact Topics Dismissed from Further Analysis

The impact topics identified below have been dismissed from further analysis because the range of stream management alternatives (1) would have no effects, (2) would have only negligible or minor, short-term effects on these resources, or (3) because the impacts have been evaluated within another impact topic.

Air quality: During implementation of the stream management action alternatives, there would be highly localized, short-term, negligible impacts on air quality from the emissions of construction equipment and potential soil removal/excavation activities. These effects would be negligible because best management practices would be used to minimize fugitive dust and emissions from construction equipment. Specific mitigation measures that would be employed are listed in Table 7 (located at the end of "The Alternatives" [Chapter 2]).

Conflicts with land use plans, policies, or concerns: Plans and policies associated with lands adjacent to the park were reviewed. It was determined that the stream management

alternatives would not involve actions that would affect these lands or the policies and plans of jurisdictions such as the city of West Branch or Cedar County.

Ecologically critical areas or other unique natural resources: The park does not contain ecological critical areas or unique natural resources. Therefore, none of the action alternatives would affect these resources as referenced in the Wild and Scenic Rivers Act, NPS *Management Policies 2001*, 40 Code of Federal Regulations 1508.27, or the 62 criteria for national natural landmarks.

Economics: The park is located off Interstate 80, in downtown West Branch in Cedar County, Iowa. The county has a mixed economic base composed mainly of agriculture, manufacturing, wholesale and retail trade. Each of these industries generates between $100 and $150 million in annual revenues and account for the majority of county employment. Total county revenues are in excess of $500 million annually (U.S. Census Bureau 2002, USDA 2002).

Total employment in Cedar County, including agricultural pursuits, is approximately 4,000 jobs (U.S. Census Bureau 2002, USDA 2002). The park employs 13 full-time employees, generating approximately 0.35 percent of local jobs. Due to its proximity to Iowa City, West Branch also serves as a suburban home setting for those who commute the 10 miles to places of employment.

The park receives approximately 200,000 visitors annually. The majority of these (75 percent) are "day trips" or visits that do not include overnight stays. In addition, about 20 percent of total annual visitation is from residents of West Branch. The estimated annual economic contribution to the local economy from all park visitors combined is approximately $8.1 million (NPS 2004d, NPS 2005a). This represents 1.6 percent of the local economic activity. Flood events occasionally require temporary park closures and multiple closures have occurred during wet years. Flooding in 1993 resulted in multiple partial-day and full-day closures to complete cleanup and repairs after each flood event that added to a closure time of two weeks that summer (McKeeman pers. comm. 2005). A two-week cumulative closure would represent a fraction of 1 percent of local economic activity.

Although recurrent inundation by floodwaters damages historic buildings and accelerates degradation, the nature of flooding at the park is not such that resources would be completely lost or "washed away." In addition, the park mandate to protect these resources necessitates that repairs be made following such events. Therefore, continuing current management would result in only short-term, periodic closures that would be unlikely to affect overall local economic activity.

The proposed action alternatives would provide increments of flood protection for vital park resources, and lessen, to varying degrees, the need for park closures due to flooding. Alternative E, which provides the highest level of protection, would virtually eliminate all closures, and maintain the park's ability to contribute to the local economy. Given the rate of current contribution, this change would not likely be measurable in the local economy.

As the rationale above has outlined, the economic impact of the park on the local economy is very small. Economic changes resulting from implementation of any of the proposed actions would be difficult to detect, and therefore this topic is dismissed from further analysis.

Endangered or threatened species and critical habitats: No federally listed threatened or endangered species are known to occur within the park. The project area does not contain any remnant prairie, only restored prairie, which is not suitable habitat for the western prairie fringed orchid (*Platanthera praeclara*) or the prairie bush clover (*Lespedeza leptostachya*). The project area also contains no known bald eagle (*Haliaeetus leucocephalus*) nests or roosting areas. In addition, changes in the stream flow would have no effect on any federally listed species downstream of Hoover Creek. An analysis of effects to state-listed species with potential to occur in the project area is included in the "Wildlife" section.

Energy requirements and conservation potential: The NPS reduces energy costs, eliminates waste, and conserves energy resources by using energy-efficient and cost-effective technology. Energy efficiency is incorporated into the decision-making process during the design and acquisition of buildings, facilities, and transportation systems that emphasize the use of renewable energy sources. The proposed action alternatives would not appreciably change the park's short- or long-term energy use or conservation practices. The gasoline and diesel fuel used during construction activities would not result in detectable changes in energy consumption in the West Branch vicinity; therefore, this impact topic is dismissed.

Ethnographic resources: Within park areas potentially affected by this project, no resources have been identified that might be associated with traditional Native American use. Area history and cultural resources closely link the park to the Quaker community, and the Friends Meetinghouse remains a visible symbol of that close historical association with the Hoover family. The local Quakers (Friends Meeting—Conservative and Friends Church) will be invited to participate in the EIS process as part of the interested public. The Friends Meetinghouse and assessment of effects of the alternative actions is discussed in the "Cultural Resources" section. Ethnographic resources will not be addressed in this plan.

Indian trust resources: Indian trust assets are owned by American Indians but are held in trust by the United States. Requirements are included in the Secretary of the Interior's Secretarial Order 3206, American Indian Tribal Rites, Federal – Tribal Trust Responsibilities; the Endangered Species Act; and Secretarial Order 3175, Departmental Responsibilities for Indian Trust Resources. According to park staff, Indian trust assets do not occur within the park. Therefore, there would be no effects on Indian trust resources resulting from any of the alternatives.

Minority and low-income populations (environmental justice): Executive Order 12898, General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires that all federal agencies address the effects of policies on minorities and low-income populations and communities. None of the alternatives analyzed would have disproportionate effects on populations as defined by the U.S. Environmental Protection Agency's 1996 guidance on environmental justice.

Natural or depletable resource requirements and conservation potential: The use of fuel was addressed under the category "energy requirements and conservation potential." To the maximum extent possible, the stream will be stabilized using natural materials including soils and vegetation. The use of new construction materials, such as stone and concrete, which would be incorporated into the stabilization project, would not affect the local supply of these materials given the ongoing residential and urban development underway in Cedar County and nearby Iowa City.

Prime and unique agricultural lands: The Council on Environmental Quality 1980 memorandum on prime and unique farmlands states that prime farmlands have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Unique agricultural land is land other than prime farmland that is used for production of specific high-value food and fiber crops. The U.S. Department of Agriculture has identified 48 prime (or prime soils under certain conditions) farmland soils in Cedar County, Iowa (USDA 2005). Of those 48 soils, two have been identified to be present within the park. These include: the Colo-Ely Complex occurring on drained 2 to 5 percent slopes covering the majority of the park, and the Tama Silt Loam occurring on 2 to 5 percent slopes existing in the area of the Thompson Farm. Although the Colo-Ely Complex occurs within the project area, these soils have been removed from long-term cultivation. Prime farmland that exists on the Thompson Farm is still used for farming purposes; however, it is outside the project area and would not be affected by stream management activities. Therefore, prime and unique agricultural soils were dismissed from further analysis.

Urban quality, historic and cultural resources, and design of the built environment: Historic and cultural resources were included as an impact topic that was considered in detail in this final SMP/EIS. Urban quality and design of the built environment were eliminated from further analysis because the stream management alternatives would have no effect on urban quality or the built environment outside Herbert Hoover National Historic Site.

Wetlands: Executive Order 11990, Protection of Wetlands, requires federal agencies to avoid, where possible, impacts on wetlands. If required, a statement of findings in compliance with DO 77-1, *Wetland Protection*, and its accompanying Procedural Manual would address any concerns for wetlands. There are no jurisdictional wetlands in the project area or outside the project area that would be at risk should any of the action alternatives be implemented.

Wilderness: The park does not contain nor is it adjacent to or under consideration for any designated or proposed wilderness areas under the 1964 Wilderness Act.

This page intentionally left blank.

THE ALTERNATIVES

The alternatives include four action alternatives and an alternative of no action/continue current management. Table 8 (located at the end this chapter) provides a summary of the elements or actions associated with each of the alternatives evaluated. Major issues related to the protection of park resources and stream function that the action alternatives were designed to address are described in "Purpose of and Need for Action" (Chapter 1). Although the option of no action/continuing current management does not solve the cultural and natural resource management issues at the park, current conditions are used as the baseline against which the action alternatives are analyzed. This is the context for determining the relative magnitude and intensity of impacts (NPS 2001).

DEVELOPMENT OF THE ALTERNATIVES

Methods Used to Develop Levels of Flood Protection and Improved Stream Function

The NPS developed an interdisciplinary team of subject matter experts and individuals familiar with the issues and problems of Hoover Creek. This team included specialists in hydrology, channel stability and maintenance, and historic and cultural resources. With input from the public scoping process, the team identified objectives that should be achieved for the project to be considered a success (described in "Purpose of and Need for Action" [Chapter 1]). The interdisciplinary team then developed management strategies that would meet these objectives to a large degree and provide for protection of the park's historic and cultural resources.

Water resource engineers evaluated previous Hoover Creek flood analyses developed by the NPS Water Resources Division and USGS and performed individual analyses in order to understand the existing problem and to assess potential alternatives that would provide a higher level of flood protection for park historic and cultural resources. Improved flood protection is part of restoration, which is defined for this project as a broad range of actions and measures designed to restore structure and function of a stream in a manner that enables the stream to function at a self-sustaining level (Society of Ecological Restoration 2004). It does not involve returning Hoover Creek to a pristine or original condition because this would not be feasible considering the stream's location within a suburban park and the nature of the current conditions and disturbances in the watershed.

Rosgen's stream condition classification system (Rosgen 1996) was used to infer stream function, such as sensitivity to disturbance, recovery potential, sediment supply, stream bank erosion potential, and vegetation controlling influence, based on observable stream characteristics. These characteristics provide the basis for quantifying the general status of the stream corridor, identifying where the existing stream falls within the classification range, and identifying treatments that would shift its classification toward more stable classificiations.

Technical literature on stream restoration revealed that the project objectives can be translated into technical criteria for design of stream restoration elements. For example, a common characteristic of natural channels is that the bankfull capacity of the main channel closely matches the mean annual flood, which has a flood recurrence interval of about 2.3

years. Another characteristic is that restoration of stream function can be greatly assisted by management measures that restore the natural hydrograph (a graph showing the water level, flow, or other property over time). This often involves actions that reduce peak and mean flows to their predevelopment values. Several other restoration measures can be highly successful in remedying deeply incised streams such as Hoover Creek. Four primary design elements that are commonly applied to incised streams include the following:

- improvements in the channel and floodplain cross-section,
- grade control modifications,
- storm water detention, and
- remeandering to increase the sinuosity and decrease the flow velocities.

Water resource engineers evaluated these potential design elements individually and in combination, to develop preliminary alternatives to meet project objectives. A range of flood-protection levels, expressed as flood recurrence intervals, were evaluated. A summary of the evaluation for these potential flood-protection ranges and restoration elements is included below. The action alternatives developed to improve the functional qualities of Hoover Creek all use these approaches to achieve separate, measurable channel flow capacities, or degrees of protection from floodwaters.

The NPS selected four flood-protection levels (10-, 15-, 25- and 50-year) that are reasonable, meet management objectives, and are analyzed in this final SMP/EIS. The four action alternatives, identified as Alternatives B, C, D, and E, include varying levels of disturbance and a wide range of implementation costs, both of which generally increase as the level of flood protection increases. The alternative of no action/continue current management is identified as Alternative A.

Recognizing that a return to the native stream conditions that existed prior to converting the prairie to agriculture and urban development was not feasible, the range of proposed alternatives meets levels of flood protection specified by the NPS and improves the functioning condition of Hoover Creek within the park boundaries.

To provide discrete, quantifiable benefits to historic properties, the range of flood-protection levels must improve the functioning condition of Hoover Creek, reduce down-cutting and incision, improve bank stability (reduce erosion), and reduce lateral movement.

To achieve the varying levels of protection and desired functioning condition, several components were identified and grouped to create the action alternatives. Some components would be implemented for all action alternatives and are described as elements common to all action alternatives. The additional actions proposed for each alternative are then described by stream management unit, from upstream to downstream.

Evaluation of Potential Channel Modifications and Site-Specific Protection Measures

Past modeling performed by the USGS developed estimates of the peak flow rates for a range of flood frequencies, but this modeling did not evaluate the timing or flow volumes passing through the watershed. Because the alternatives include elements involving control of runoff volumes and peak flows, additional hydrologic and hydraulic models were developed to establish the timing and volume of high flows in the park.

Several channel and riparian corridor modifications were analyzed using the U.S. Army Corps of Engineers Hydrologic Engineering Center River Analysis System (HEC-RAS). These models revealed potential benefits to flood protection and stream function by constructing a new channel that could carry approximately 1,000 to 1,100 cfs (the high water event with a return frequency of between 5 and 10 years); adjusting, or remeandering, the channel location away from the Library-Museum; installing a grade control structure (for flattening slope and lowering flow velocity) to eliminate down-cutting in the channel; and planting and maintaining low-profile vegetation. Incorporation of these elements was found to protect park resources from frequent events of relatively low magnitude (up to the 5-year event) and to stabilize the creek to improve proper function.

All of the action alternatives incorporate these stream channel modifications. Alternatives B and C were developed by incorporating these stream channel modifications alone to provide modest levels of protection for the 10- and 15-year flood flows and to improve stream function by stabilizing the banks and reducing erosion and down-cutting.

Evaluation of Potential Detention Storage

The new channel configuration would increase the channel capacity to approximately 1,050 cfs. Additional measures were then evaluated that would reduce the peak flow. The leading method of reducing peak flow is to provide detention storage within or near the stream channel. The park's native prairie was identified as a possible location for a detention facility. The area of land that could potentially be used for detention storage was then calculated using geographic information system (GIS) mapping. Hydraulic modeling was then conducted using the available storage volume to determine the relationship between stage (water level), storage, discharge, and the corresponding reduction in peak flow.

To evaluate options for providing levels of flood protection beyond the 15-year event, two alternatives were developed that include the stream channel modifications described above and the construction of an upstream storm water runoff detention basin within the park. Alternatives D and E were designed to control peak flows from the 25- and 50-year flood flows in Hoover Creek.

At the confluence of the two tributaries that form Hoover Creek, approximately 37 acre-feet of natural storage would be available if a berm or embankment were installed and outgoing flows controlled. The park defined this location as suitable for development of additional storage through excavation, construction of a berm or embankment, and installation of culverts to control releases into Hoover Creek. Control of peak high flows would be achieved by creating 67 acre-feet of storage for the 25-year event or 138 acre-feet of storage for the 50-year event.

Assumptions Made for Development of Alternatives

Future Development Acreage: Watershed and flood-protection modeling was performed using a proposed area of development outside of the park. Of a total 168 acres, 107 acres lie within the sub-basin to the north of the park, and 61 acres lie within the sub-basin to the west of the park. The tributaries of these two sub-basins join to form Hoover Creek at the upstream end of the park.

Stormwater Control Compliance: In 1998 the city of West Branch passed Resolution No. 543 modifying their storm water management policy. This revision requires new developments to "detain the difference in volume of the five year undeveloped storm and the one hundred year developed storm events for their development site. The allowable release rate for the detention calculations shall be the five year undeveloped storm." This policy requires developers to implement storm water detention to contain runoff from the high volume, infrequent events, and release it at the 5-year storm rate. As development in the watershed continues, peak flows will be reduced as runoff is stored in the detention structures. Over time, flows generated by precipitation events in excess of the 5-year storm will be diminished. One hundred percent compliance to this policy was assumed for the 168 acres of future development.

Backwater Effects from the West Branch of Wapsinonoc Creek: The west branch of the Wapsinonoc is not gauged in the vicinity of Hoover Creek, and no historic flow data are available. The creek drains a larger watershed and appears to carry several times the volume of Hoover Creek. Because of the relatively small contribution of Hoover Creek to the west branch of the Wapsinonoc Creek flows, it was assumed that actions taken within the park to manage Hoover Creek would not substantially diminish the frequent backwater flooding effects that occur in the Village Green Stream Management Unit.

ALTERNATIVE A: NO ACTION/CONTINUE CURRENT MANAGEMENT

Introduction

Maintenance and management of the stream corridor and the park's emergency response to flood events would remain unchanged. Although continuing current practices does not meet the objectives of the project, the existing conditions are used as a baseline against which the other alternatives are analyzed. The following description is presented to describe current conditions and uses the individual stream management units, from upstream to downstream, as reference locations through the park. The management units are: Prairie at the northwest part of the park; Recreation at the pedestrian bridge and picnic area; Historic Core that contains the primary historic resources; and Village Green where the Visitor Center and maintenance facility lie just upstream of the confluence of Hoover Creek with the west branch of Wapsinonoc Creek.

The total costs associated with this alternative would vary based on the frequency and magnitude of flood events. Expenses would continue to be incurred for flood preparation when an imminent flood poses risk to park facilities. Costs related to preparation for floods vary with the magnitude of the flood, and range from about $6,000 to $12,000. In addition, costs for repair of park facilities would depend on the nature and extent of damages. For example, flood recovery efforts following the 1993 flood cost the park approximately $300,000 (McKeeman pers. comm. 2005).

Channel Characteristics

As described in "Purpose of and Need for Action" (Chapter 1), Hoover Creek is a perennial stream, with an average annual flow volume of 2 to 3 cfs. The current stream capacity (channel discharge volume) has been calculated during development of the 2004 engineering

study prepared for this final SMP/EIS at approximately 315 cfs (NPS 2004b). This capacity is lower than values previously calculated for the stream, and includes consideration of a low spot or "breakout" point in the bank near the picnic facility, just downstream of the pedestrian bridge. At this location, the natural topography allows the stream to overflow its bank on the north at a relatively low flow volume. This 315 cfs capacity would be exceeded by 2-year event flows. The deep, narrow channel also carries flow at a maximum rate of 5.6 feet per second. This rate is considered rapid for a stream of this size, and accelerates erosion and incision of the stream channel.

The creek's stream corridor is generally in a degraded state, and has lost many of its natural functioning characteristics. The stream is deeply incised, with depths ranging between 7 to 10 feet from channel bottom to top of bank. The banks of the stream are nearly vertical. Erosive processes are evident throughout the reach, with slumping of banks and mass wasting present at meander banks. Overhanging vegetation often obscures the channel. In general, these are the characteristics of an unstable stream channel (see Figure 12). The minimum channel capacity is exceeded at flow rates equivalent to the 2-year event.

FIGURE 12. DEGRADED CHANNEL CONDITION

This alternative does not include changes to the stream channel characteristics or to management of historic properties for flood protection. Ongoing grounds maintenance, which includes mowing adjacent to the stream and occasional clearing of dense vegetation, would continue.

The specific protections provided to historic structures after the 1993 flood would remain in place (see the "Historic Structures" section in "Affected Environment" [Chapter 3]). The

drainage systems and waterproofing used to protect these properties would continue to be evaluated and maintained by park staff.

When flooding is imminent, park staff would be responsible to take appropriate action depending on the level of the threat. Actions likely to be undertaken would include: removal of interpretive or historic items from threatened properties, closing the park and Visitor Center to public access, and relocation of equipment from the maintenance facility to higher ground at the Miles Farm or another suitable location.

Post-flood activities would include actions to return the park to normal operating conditions, such as cleaning and repairing sump pumps in historic structures, rehabilitation of waterproof coatings, cleaning and restoring damaged historic properties or objects, debris removal and landscape clean-up, and stream channel repairs and replanting. These activities are generally undertaken by park staff, in addition to their regular park duties. Following the 1993 flood, the steam channel was realigned in accord with bridge placement, stabilization measures were installed, and in 2000, a stream gauging station was installed on the creek.

Flood Frequencies

The following table summarizes the expected frequencies or recurrence intervals of flood events that would affect historic structures and park facilities along the Hoover Creek corridor. These frequencies are based on the elevation at which water would contact the structure. The extent of damage to a structure is dependent on multiple factors, one of which is the elevation of floodwaters. Other factors include the flow velocity, rate of rise and fall of floodwaters, duration of a flood, and debris in the water. Structures within the park can be affected by increased flows in Hoover Creek, as well as water-logging effects due to backwater from the west branch of Wapsinonoc Creek.

TABLE 3. FIRST CONTACT FLOOD FREQUENCIES UNDER EXISTING CONDITIONS

Feature (from upstream to downstream)	First Contact
Picnic Shelters/Comfort Station	25 years
Library-Museum	5 years
Scellar's Barn	Less than 5 years
Schoolhouse	43 years
Blacksmith Shop	27 years
Birthplace Cottage	17 years
Isis Statue	15 years
Friends Meetinghouse	Less than 5 years
Visitor Center	7 years
Maintenance Buildings	Less than 5 years

Prairie Stream Management Unit

This unit extends from the prairie's northwest corner approximately 1,200 feet along the creek corridor. A mowed path is maintained to provide visitor and staff access to this portion of the park. There are no hard surfaced trails or developed facilities in this unit.

Park maintenance of this section is minimal and natural processes dominate. This area is included in the park's fire management plan, and prescribed fire is used in the area approximately every 3 to 5 years to maintain natural tallgrass prairie processes. The soil crown lying between the two tributary creeks is infested with smooth brome and reed canary grass, two invasive exotic grasses. The park uses Environmental Protection Agency (EPA)-approved herbicides and application methods to control this infestation.

This unit is in generally degraded condition, with the banks incised and evidence of active bank slumping and erosion. The streambed and channel bottom is approximately 9 feet below the top of the stream bank (Figure 13). Portions of the stream were "relocated" in 1970 to straighten its path along the north boundary fence.

FIGURE 13. HOOVER CREEK THROUGH THE PRAIRIE STREAM MANAGEMENT UNIT

Recreation Stream Management Unit

This unit extends downstream from the eastern end of the Prairie Stream Management Unit, past the pedestrian bridge and picnic area, to the west end of the Library-Museum. This unit is bounded on the north by private residences and on the south by the loop drive.

This unit is maintained for day-use activities, such as walking and picnicking, and has an open appearance, with decreased vegetation density along the stream banks. The depth to the channel bottom is 6 to 8 feet, with a narrower bank-to-bank width of 30 to 60 feet. A

minimum channel capacity, or breakout point, that occurs at a flow of 315 cfs is located in this unit. Storm water from the Library-Museum parking area is currently carried to the creek by conventional storm water drains and this runoff would continue to enter the stream without treatment.

Current management of this unit that would continue into the future includes maintenance of the pedestrian bridge and the USGS stream gauging station. The landscape is mowed Kentucky bluegrass that provides a recreational, or city park-like setting.

Historic Core Stream Management Unit

This unit extends from the Library-Museum, downstream (eastward) to just east of the Friends Meetinghouse.

Outside the stream channel, the landscape is a manicured lawn. The view from the Birthplace Cottage to the Gravesite is maintained, and the historic structures are maintained in a well-kept appearance. The waterproofing and sump pump installation undertaken in several of the historic structures after the flood of 1993 would be kept in place and maintained in good operating condition. The remaining components of the 1930s retaining wall, on the south bank just upstream of the Downey Street Bridge, receive periodic vegetation removal, but no structural stabilization currently takes place (Figure 14).

FIGURE 14. HISTORIC CORE AT RETAINING WALL SITE

Village Green Stream Management Unit

This unit extends downstream from just east of the Friends Meetinghouse toward the confluence with the west branch of Wapsinonoc Creek. East of the Parkside Drive Bridge,

the stream corridor is managed in accord with the needs of park administration and maintenance. Management of this reach includes mowing of the lawn areas around the Visitor Center, parking area, and maintenance yard, and minimal vegetation control in the stream corridor.

Two parking areas provide access to the Visitor Center and the Village Green in the northeast corner of the park. Storm water management measures have not been installed on either of these lots, and runoff drains directly into Hoover Creek through drop boxes or runoff channels in the landscape. There are no plans to install storm water management measures under continued current management.

Because of the fairly frequent inundation of the park's maintenance facility, management actions in this unit include moving equipment from the maintenance yard to safe sites during flood events. Park staff is responsible to relocate vehicles, tractors, and other maintenance equipment to the Miles Farm or other high ground when flooding is imminent.

Stream Monitoring

Park staff currently monitors several characteristics of Hoover Creek including rate of down-cutting, lateral movement, and stream bank vegetation. Monitoring activities are conducted regularly by natural resource and park operations personnel using personal observation and recording of findings.

Flows in Hoover Creek are monitored continuously by an automated USGS streamflow gauging station, number USGS 05464942, and information gathered by this unit can be found at http://nwis.waterdata.usgs.gov/nwis/discharge/?site_no=05464942 (USGS 2005). This station was installed near the pedestrian bridge in the Recreation Stream Management Unit in 2000 as a demonstration gauge.

Water quality testing for microbial contaminants such as fecal coliform and *E. coli* bacteria was conducted in 2001 and 2003. The park submitted samples to the State Hygenics Lab at the University of Iowa. The Iowa Department of Natural Resources and USGS also conducted water quality sampling in 2004 and 2005. Water quality testing is expected to continue into the future until indicator bacteria levels fall to levels that no longer pose a threat to human health.

ELEMENTS COMMON TO ALL ACTION ALTERNATIVES

Channel Characteristics

The following components alone provide a measurable increment in both flood protection and stream function and are carried through the range of action alternatives. An initial incremental level of flood protection in excess of 5 years can be achieved by replacing the existing channel with an engineered design to increase capacity and a new meander pattern to slow the flow rate. This new channel would consist of approximately 2,000 feet of standardized cross section, approximately 500 feet of new meander pattern, a grade control structure to eliminate down-cutting, and reclamation of the portions of the existing channel after the new meanders are complete. The new channel would have a consistent bottom width, uniform stream bank elevation and slope ratios, constant channel capacity, and new

meander pattern to slow flow velocity (see Figure 15). The engineered channel would be created through the park, from a point just downstream of the confluence of the north and west tributaries to the eastern boundary, just before the confluence with the west branch of the Wapsinonoc.

Under all action alternatives, a new channel would be designed and created to resemble the conditions that were characteristic of the stream in the 1930s through the 1950s. These characteristics were identified as appropriate during public scoping: a more open appearance with large trees set back from the creek or "a pasture with a stream passing through it" and is within the park's period of significance of 1874 to 1966. This time period was also selected because there is more definitive documentation. In addition, the stream function goal for the new channel would be to establish a course that has low sensitivity to disturbance and very good recovery potential (tendency of the channel to remain in its position) when disturbed (such as by the 50- or 100-year flow event). The stream function goal for Hoover Creek is a Rosgen's stream classification of Type C or Type E (see Appendix E), which would be achieved by designing the channel template to the maximum extent possible to design criteria obtained from literature. Although a Type C reach is preferred, practical limitations prevent a full shift to this class for the entire length of the stream channel. The nature of the historic resources and cultural landscape limits the length of remeandering that can be constructed in the park, which would affect such design criteria as sinuosity, curvature ratio, and meander wavelength. Therefore, it is anticipated that some reaches of the creek could fall between C and E stream types and would likely demonstrate a mix of characteristics of both. The result would likely be a C to E type stream channel, which is "highly stable" and would be a substantial improvement over existing conditions along the stream corridor. Overall, the channel would be highly stable, slightly entrenched, sinuous, less sensitive to disturbance, and would have increased recovery potential (NPS 2006a).

The construction of banks at a consistent elevation would increase stream channel capacity from the 315 cfs to about 1,050 cfs. The stream would be capable of carrying flows in excess of the 5-year flood event within its channel, as opposed to the existing capacity of containing a 2-year event. The engineered channel and remeandering would adjust low bank elevations that currently allow breakout of relatively low flows (315 cfs).

The proposed engineered channel may have the following characteristics based on existing conditions, design criteria obtained from literature, and modeling. The final dimensions would be determined during engineering design. The channel would be approximately 8 feet wide at the bottom and would have sloping sides with a 1.5 horizontal to 1 vertical ratio (about a 30 degree slope to the stream). The depth from the stream bank to the floor of the channel would be similar to existing conditions, which ranges from 7 to 10 feet. The bank-to-bank distance at the top of the channel would be approximately 30 to 40 feet.

Although the channel banks would be fairly steep, they would be covered with vegetation chosen to produce low, tough groundcover that does not require mowing. The vegetation would also provide roughness and flow resistance to help retain bank stability and slow flows. At sharper turns in the remeandered corridor, reinforcement could be required. The location, size, and types of these features would be determined during final engineering design.

To address the varying capacity of the stream that results from the natural change in elevation of the landscape (i.e., breakout points), the banks of the stream would be graded to a fairly consistent elevation. This would result in increased bank heights of approximately 2 feet along the north bank through the Recreation Stream Management Unit. Approximately 1 foot would be added to the banks through the Historic Core and Village Green Stream Management Units. Through remeandering and channel adjustments, these changes would slope gradually into the natural topography and would not be evident once vegetation was reestablished.

All construction activities would be carried out using common construction equipment including excavators, front-end loaders, skid-steer loaders, graders, and dump trucks. The project would be conducted by a contractor and would take approximately 3 to 6 months to complete. Construction would commence in late summer and extend through the fall, when precipitation is low to limit erosion and sediment delivery to the west branch of the Wapsinonoc. Revegetation/reclamation would be done when construction was complete.

Using a 100-foot disturbance corridor for the 2,000-foot length of channel construction, approximately 4.5 acres would be disturbed for channel reconfiguration. Contractors would abide by all laws, regulations, and policies relative to protection of water and soil resources.

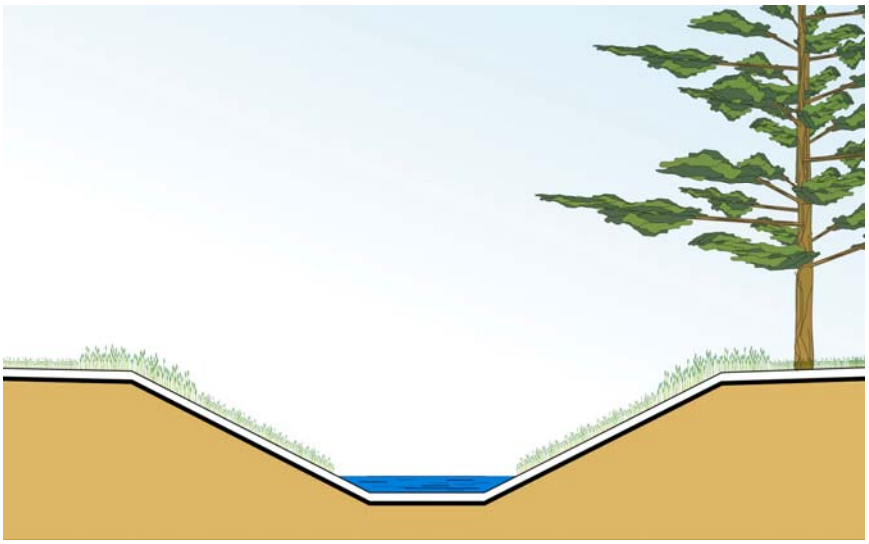

FIGURE 15. PROPOSED DESIGNED CHANNEL CROSS-SECTION

Once established, the new channel would be fairly stable, and the creek would convey a relatively low sediment load. The current high sediment load is generated largely by erosion of adjacent banks, and this process would be reduced. Therefore, channel maintenance activities would be limited to maintaining the integrity of the vegetative cover and rehabilitation efforts (sediment and debris removal and revegetation) that may be necessary after extreme flows, such as the 50-year flood event.

New Meander Pattern

In addition to increasing the creek's capacity by constructing the standardized channel, flow velocities would be slowed by including a new meander pattern through the Recreation Stream Management Unit (see Figure 16). Remeandering of the stream course would begin downstream of the pedestrian bridge. With a goal of providing long-term protection for the Library-Museum, approximately 500 feet of the channel would be relocated. The new pattern would be more sinuous and would be constructed a minimum of 100 feet from the Library-Museum. The new stream course would be excavated to the depth and width of the standard channel configuration, stabilized, and vegetated. At sharper turns in the remeandered corridor, reinforcement using bioengineering techniques could be required. The location, size, and types of these features would be determined during final engineering design.

Once the new channel was excavated, the existing channel would be filled with excavated material from the new location, compacted, and revegetated with appropriate plant species. Several mature trees now growing in this management unit would be removed during construction and, where appropriate, the park would replant trees to replace the lost specimens. Installation of low-mow or no-mow grass would be consistent with the managed, but not manicured, appearance of this stream management unit, while maintaining the Birthplace-Gravesite vista that is a fundamental value of the park.

Grade Control Structure

Due to the increasing slope of the stream channel downstream of the pedestrian bridge in the Recreation Stream Management Unit, a grade control structure would be installed just upstream of the Downey Street Bridge to control down-cutting. This structure would provide approximately 1 foot of drop in the stream bed elevation and would be constructed of concrete or rock. As water spills over such structures, velocity is lowered, which reduces the potential for downstream erosion. The estimated peak flow velocity using such grade control measure would be 5 feet per second or less. Final design and engineering evaluation would target a flow velocity of approximately 4.5 feet per second. This lower flow rate would reduce erosion potential and increase both lateral and vertical stability in the channel.

Recreation Stream Management Unit

The pedestrian bridge would remain in place, as the new channel design would not require its replacement. The USGS stream gauging station may be put out of service temporarily and relocated by several feet to accommodate the new stream bank. The fallen rubble remaining from previous stabilization efforts would be cleared from the streambed, and dense vegetation would be cleared.

The Library-Museum parking lot storm drains would be fitted with appropriate storm water management measures. During channel reconstruction, a non-mechanical underground oil-water separator would be installed to improve the water quality of runoff entering the stream. Oil-water separators are generally maintained by services specializing in proper removal and disposal of road and hydrocarbon wastes.

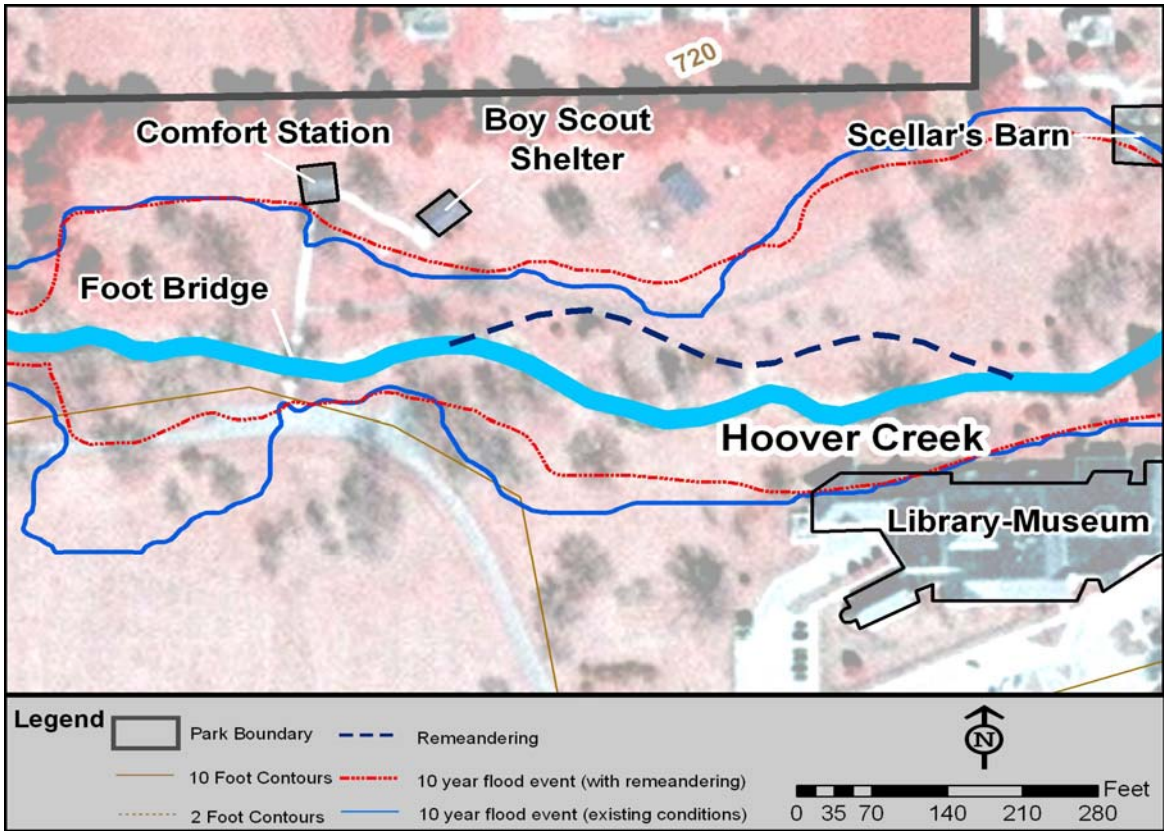

FIGURE 16. HOOVER CREEK REMEANDERING CONCEPT

Historic Core Stream Management Unit

Excavation of the stream channel would provide the opportunity to rehabilitate the historic retaining wall located just upstream of the Downey Street Bridge. This stream bank stabilization measure installed in the 1930s would be carefully removed, and stones would be retained for reuse at that location. Once the channel was established, the wall would be installed in approximately the same location, using original materials. Maintenance at the site would prevent vegetation from encroaching in the future to help protect the remaining historic fabric.

The park would continue to maintain the specific flood-protection measures that are currently in place at the various historic structures. The Friends Meetinghouse was fitted with drainage tiles, backflow prevention, external mastic-type sealant, and a basement sump pump in 1993 and 1994. The Birthplace Cottage has drainage tiling, backflow prevention, a sump pump, sealant coating, and ¼-inch sheets of bentonite on the foundation to impede water infiltration. All the buildings west of Downey Street, except Scellar's Barn, are connected to a storm water lift station located at the barn. This connection was made to existing drainage where available. These drains carry water directly from the structures to Hoover Creek. These features would continue to receive routine inspection, maintenance, and repair by park staff. All waterproofing materials and methods would be compliant with the Secretary of the Interior's standards for treatment of historic structures.

Village Green Stream Management Unit

The two parking areas that provide access to the Visitor Center and the Village Green would be fitted with appropriate storm water management measures. During channel reconstruction, a non-mechanical underground oil-water separator or a small storm water management pond would be installed to improve the water quality of storm water entering the stream from the parking lots. At this time, the storm water drain that serves the Visitor Center loading dock would be connected into the management system. Use of either unit would require routine maintenance by a contractor to ensure proper function. The oil-water separator would be maintained by a special service provider. Storm water management ponds require infrequent monitoring of liner integrity, retention time, and vegetation health.

Soil Disposal and Mitigation

The park would stage the materials needed for construction at the maintenance facility or at the Thompson Farm. Soil excavated from the stream channel that would not be needed to complete other aspects of the project would be made available locally. Interest in obtaining this clean, high-quality soil has been expressed by local groups.

Best management practices for protection of water quality and mitigation measures for other resources would be fully implemented during project construction. A list of anticipated measures is included in Table 7 “Mitigation Measures of the Action Alternatives” presented at the end of the alternatives description.

Stream Monitoring

Park staff would continue to monitor characteristics of Hoover Creek to determine the success and sustainability of the stream management plan. Continued recording of down-cutting, lateral movement, and changes in stream bank vegetation would facilitate the use of adaptive management in maintaining the stream channel in a stable and functioning condition. Thresholds for action would be established, with options for landscape maintenance, increased or decreased meander reinforcement, or changes in stream bank vegetation determined as thresholds are approached.

As described for the No Action Alternative, flows in Hoover Creek would be continuously monitored by the automated USGS streamflow gauging station. The data gathered by this station could, over the long term, inform the park regarding the efficacy of the West Branch storm water management policy, and provide other information for making management decisions about Hoover Creek.

Water quality testing for microbial contaminants such as fecal coliform and *E. coli* bacteria would be periodically performed, as described for the No Action Alternative. The continuation of the activity into the future is expected until indicator bacteria levels fall to levels that no longer pose a threat to human health.

Long-Term Flood Mitigation and Disaster Protection

Each of the action alternatives provides a discrete level of protection for park resources from flood events. However, when flood events of greater magnitude than the design capacity occur, the park would implement their flood emergency plan and respond appropriately to the threat level. Measures would be taken to protect park resources, public health and safety, and

the visitor experience. In the event of a large magnitude flood, such as the 100-year event, repair and rehabilitation of specific historic structures and other park facilities would likely be required. Specific actions would be determined as part of a post-flood emergency response plan.

The stream channel would be expected to remain stable and undamaged during flows that meet or somewhat exceed the design capacity. Higher magnitude floods that overwhelm the channel and inundate the floodplain could damage the channel. However, the extent of damage would vary based on flow volume, velocity, and duration. For all but the most uncommon events, little channel damage would be anticipated. The park would replant vegetation on stream banks and perform minor bank repairs and stabilization. In the event of a large magnitude event, such as the 100-year flood, repair, rehabilitation, or reconstruction of much of the channel could be necessary. Specific actions would be determined as part of a post-flood emergency response plan.

ALTERNATIVE B: PROVIDE 10-YEAR FLOOD PROTECTION

To provide relatively consistent 10-year flood protection for park resources, the 5-year flood flow protection afforded by elements common to all action alternatives would be supplemented by site-specific actions at several historic structures and the Library-Museum. As with all the action alternatives, this alternative includes changes to the stream channel dimensions, remeandering and channel relocation, and installation of a grade control structure to control down-cutting.

The costs, including all excavation, construction, materials disposal, contingencies, and revegetation by seeding and mulching, are estimated at $178,000. Flood preparation and repair costs would be avoided up to the 10-year flood event. Necessary costs for flood events of greater magnitude would be as described in Alternative A.

Channel Characteristics

Clearing and stabilizing the upstream reaches within the Prairie Stream Management Unit would be accomplished. This would provide consistent channel capacity for the length of the creek corridor.

However, during the 10-year flow event, five locations, in particular, could be affected by floodwaters: Scellar's Barn, Library-Museum, Friends Meetinghouse, Visitor Center, and maintenance area. Table 4 summarizes the flow frequency at which contact with park historical or other structural resources occurs.

Prairie Stream Management Unit

The north and west tributaries within the park would be modified using a design similar to that of the main channel that would provide inflows to correspond with the new Hoover Creek capacity of 1,050 cfs. The tributaries would be cleared of debris and vegetation, excavated, and stabilized with native grasses, similar to the treatment proposed for downstream segments. The precise dimensions and capacity of these channels would be determined during final engineering design.

TABLE 4. COMPARISON OF FIRST CONTACT FLOOD-PROTECTION LEVELS: EXISTING CONDITIONS AND WITH CHANNEL ALTERATIONS

Feature	Existing Conditions	Channel Alterations
Picnic Shelters/Comfort Station	25 years	56 years
Library-Museum	5 years	8 years
Scellar's Barn	Less than 5 years	5 years
Schoolhouse	43 years	68 years
Blacksmith Shop	27 years	67 years
Birthplace Cottage	17 years	23 years
Isis Statue	15 years	18 years
Friends Meetinghouse	Less than 5 years	5 years
Visitor Center	7 years	10 years
Maintenance Buildings	Less than 5 years	Less than 5 years

Limited grading and reduction of the crown between the tributaries would be implemented. The willow trees and pines located on the banks of the northern tributary would potentially be removed, and the park would continue to use prescribed fire and other vegetation management measures at this location, as appropriate, after vegetation in the channels became established.

The disturbance needed would be largely confined to the stream channel and banks. Excavation and grading would be undertaken in the dry months of autumn, when stream flow is generally less than 2 cfs, to reduce the potential for sediment delivery downstream. Reseeding would be undertaken as appropriate for selected plant species and would occur no later than the following summer. Best management practices to reduce erosion and protect water quality would be implemented throughout the construction area. (For detailed information see Table 7 "Mitigation Measures of the Action Alternatives.")

Recreation Stream Management Unit

The actions carried out in this unit are those described for all action alternatives: installation of the channel template, remeandering and relocation of the stream course, clearing channel of debris, installation of a storm water management unit for Library-Museum parking lot runoff, and preservation of the pedestrian bridge and stream gauging station.

Historic Core Stream Management Unit

This unit would maintain its manicured appearance, while receiving the new channel configuration, vegetation removal, and grade stabilization (installation of the drop structure). The historic retaining wall on the south creek bank would be reconstructed after installation of the channel template. The new meandering pattern would join the natural channel at a location approximately parallel to Scellar's Barn, and the native channel location would remain in place through the Historic Core downstream to the creek's confluence with the west branch of Wapsinonoc Creek.

At the western end of the Historic Core, the exterior foundation of Scellar's Barn would be contacted by floodwaters from flows in excess of the 5-year event. This is due to the natural topography of this part of the park. The south side of the barn is located at 710 feet above sea level, which is approximately 2 feet lower than the proposed stream bank elevation through this reach. Scellar's Barn is not a listed historic structure and is used by the park to store maintenance equipment. In addition, the first floor elevation of the barn is above the 20-year flood elevation. Because the floor elevation provides protection exceeding the design parameter of this alternative, no further protective measures would be prescribed for this site.

The open view from the Birthplace Cottage to the Gravesite would be maintained. No large trees would be removed in this management unit. To provide 10-year protection for the Library-Museum and Friends Meetinghouse, specific measures would be taken to prevent floodwaters from entering these structures.

The Library-Museum would receive some increased protection due to channel adjustments – from 5-year to 8-year protection. To meet the 10-year event design guide for this alternative, the park would recommend an impervious, waterproof coating be applied to the foundation to prevent water from seeping through the stonework during flood events.

In general, as structural aging and weathering occurs, concrete, brick, and wooden walls develop small cracks that water can seep into. Masonry construction is not inherently impenetrable. Therefore, seepage can occur through external walls when they are subjected to floodwaters (FEMA 1986). Sealants can be used to prevent seepage. A sealant is a waterproof coating applied to the outside of an existing wall or beneath the façade of a structure to reduce or eliminate permeability. Coatings are generally asphalt or polymeric compounds that may be painted or sprayed onto interior or exterior surfaces (FEMA 1986).

Waterproof coatings are generally applied on the foundation, up to the first floor level. At the Library-Museum, this would protect the building during high water up to approximately the 25-year flood event (when water would likely intrude on the first floor level). An appropriate coating, designed for use on stone and mortar in local environmental conditions, would be selected. Application would be on the foundation exterior depending on the nature of the coating, visual impact, and predicted service. A recommendation to water proof the Library-Museum, using appropriate materials and techniques, would also be made to assure that protection is provided for this structure.

The location of the Friends Meetinghouse, just east of the Downey Street Bridge, is subject to inundation by backwater from the west branch of the Wapsinonoc. This site would continue to experience floods as frequently as 5-year events. However, the protection measures in place at this structure (drainage tiles, sump pump, and waterproof foundation) provide protection to the first floor level. Because the frequent high water here is largely attributable to backwater effects, the structure is not threatened by high flow velocities. The first floor is elevated well above the foundation, and a flood in excess of the 100-year event would have to occur for water to enter the first floor of the building. Therefore, no further protection is required at this location.

Village Green Stream Management Unit

Common elements, including vegetation clearing, channel template, and storm water management, would be implemented to provide approximately 1,050 cfs flow capacity in

Hoover Creek and improved storm water quality for resource protection. However, this unit has high flood frequencies due to high water at the Hoover Creek confluence with the west branch of Wapsinonoc Creek.

The Visitor Center would receive no added protection under this alternative, as the first floor elevation matches the 10-year flood event level and would be considered protected by the design guide prescription. Because this modern structure was built on a solid concrete slab, the first contact with the entry ramp and foundation by floodwaters from the 7-year event are not considered to be a serious threat to the Visitor Center.

The maintenance facility, located on the south bank of Hoover Creek, east of Parkside Drive, is the park facility most subject to backwater flooding from the west branch of the Wapsinonoc. First contact occurs at frequencies of less than every 5 years. However, the floor elevations of the permanent buildings are exceeded during 9-year or greater flood events. In view of the park's long-term goal to relocate the maintenance facility to the Thompson Farm on the west end of the park, the park would provide no additional flood protection at this site. Equipment would continue to be moved during high water, and open-air storage of materials would be limited to those that are not subject to damage by flood waters.

ALTERNATIVE C: PROVIDE 15-YEAR FLOOD PROTECTION

This includes all components of the 10-year flood protection design of Alternative B, with enhancements to specific sites that would be vulnerable to the 15-year event. Since existing waterproofing achieves 100-year flood protection for the Friends Meetinghouse and waterproofing in Alternative B provides approximately 25-year flood protection for the Library-Museum, no further action would be required at these locations. However, three structures would continue to be at risk during the 15-year flood: Scellar's Barn, the Visitor Center, and the maintenance facility.

To provide protection of Scellar's Barn in excess of that provided by the floor elevation, waterproofing of the foundation would be added. The appropriate waterproofing technique would be identified during final project design and could include painting or spraying of sealant on the exterior (and interior, if necessary) of the foundation, or adhering an impervious, engineered fabric to the foundation exterior.

At the Visitor Center, waterproof door shields would be installed on the east, south, and west side entrances to the building. These shields would act as barriers to water entry by effectively sealing the doors and other entries by the use of impenetrable materials and waterproof gaskets. The flood shields would be made of a specialized frame, into which impervious panels, generally made of steel or aluminum, would be inserted. The shields would be placed into the frames by park staff when flooding is imminent. Such shields are commonly used on office buildings. The permanent frames would not interfere with normal access, and can be made to blend with the architecture of the building. Such measures would be anticipated to protect the Visitor Center from major events in excess of the 10-year event and through extreme floods such as the 50-year event.

At the maintenance facility, the high inundation frequency due to backwater effects would require several modifications to greatly reduce or eliminate effects of the 15-year event. The

exterior brick and concrete would be waterproofed from the foundations to a height of approximately 2 feet to prevent seepage of floodwaters into the walls. Waterproof door shields would be installed on entrances, including the equipment bays, to reduce water intrusion into these structures. In the event of imminent flooding, equipment would be removed from the site to higher ground by park staff.

The costs, including excavation, construction, materials disposal, contingencies, revegetation, and installation of building-specific flood protection, have been estimated at $275,000. Flood preparation and repair costs would be avoided up to the 15-year flood event. Necessary costs for flood events of greater magnitude would be as described in Alternative A.

ALTERNATIVE D: PROVIDE 25-YEAR FLOOD PROTECTION

Few options are feasible for providing protection from infrequent flood events of great magnitude. One of the most common methods to achieve these levels of protection is constructing storage (detention) for incoming flows. Changes to the channel configuration, remeandering, and certain site-specific building modifications at the Friends Meetinghouse and Visitor Center would be further enhanced by constructing a detention basin in the upstream reaches of Hoover Creek. Excavation would provide a basin where incoming flows are slowed and spread, and then released into the downstream channel at a limited rate.

Flows from the 25-year flood event could be reduced to 1,050 cfs by the upstream water-storage facility and then controlling release of storm flow from this facility. Based on hydrologic modeling and location of park resources, the prairie was identified as having the characteristics, in capacity (size) and topography, appropriate for development of the detention basin.

The resulting flow into the channel from the detention facility during a 25-year event would be reduced to 1,050 cfs, which roughly corresponds to the designed channel capacity. Because flows are not anticipated to approach historic structures or the Library-Museum, no additional actions would be needed in the Recreation and Historic Core Stream Management Units.

The costs, including excavation, construction, contingencies, revegetation, and flood protection, have been estimated at $1.03 million. Flood preparation costs, ranging from $6,000 to $12,000 per flood, would be avoided up to the 25-year flood event. Damage and recovery costs for flood events of greater magnitude would be as described in Alternative A, with a comparison being the 1993 flood (a 35-year event) costing the park approximately $300,000.

Channel Characteristics

This alternative includes the 1,050-cfs designed channel, remeandering, vegetation removal, and stabilization with appropriate vegetation, which are elements included in all action alternatives.

Prairie Stream Management Unit

Reducing the peak flows in Hoover Creek by managing water releases from a detention basin can be accomplished by constructing an upstream 67-acre-foot (22 million gallon) storage facility at the confluence of the north and west tributaries. Although some storage capacity exists at this site, excavation would be required to enlarge the existing 37-acre-feet capacity to 67 acre-feet of storage. The western tributary through the detention storage site would be preserved, while the northern tributary would be reconfigured to allow for construction of the embankment. Much of the mound between the tributaries and some of the hillside to the south would be excavated. The total excavation for this option is about 78,000 cubic yards. In the event that all topsoil is removed and underlying soil layers exposed, excavated topsoil would be banked. At least 2 feet of topsoil would be replaced to ensure support of a vegetative community and to protect groundwater resources. During excavation and grading, existing agricultural drainage tiles would be broken so that water would no longer drain directly into the creek.

The excavation would disturb approximately 12 acres. The constructed basin would have sloped sides vegetated with native plants, and would not be designed to detain water other than during high flow periods. Depending on the frequency and magnitude of flows, vegetation in the basin could naturally change in diversity to adjust to increased water availability, and additional seeding could be done to increase plant diversity.

Because the excavated soil would have multiple uses, its final disposition would be evaluated to assess any cost reductions due to trade or reuse of the soil. Some of the excavated material would be suitable for constructing the embankment, and other portions could be used to berm along the north side of the detention area to provide additional flood protection for the adjacent private property developments.

Water would be detained in the excavated site by an embankment located approximately 300 feet downstream of the confluence. The proposed embankment would be approximately 12 feet high (from creek channel bottom to top of embankment), 10 feet wide at the top, 106 feet wide at the bottom, and would have gradual upstream and downstream face slopes of 4 to1 (see Figure 17). The bottom of the detention area would be excavated to about the 716-foot contour. If desired, walking trails or maintenance access could pass over the top of the embankment.

The top of the embankment elevation would be set at the 720-foot contour, and the length for this 67 acre-feet option would be about 300 feet. Along the park's northern boundary the top of the embankment would be placed at 724 feet in elevation. This increased height would prevent runoff from uncommon storms (of greater magnitude than the 25-year event) from ponding on adjacent private property. The road elevation at Main Street would help contain the storm water on park lands, and the 720 foot elevation of the downstream embankment would allow overtopping and flow into the creek before roads were inundated. Installation of a hardened surface, such as a geotextile stabilizing fabric, grassblock, or asphalt, on the embankment top could provide an emergency spillway for overtopping, and could be used to provide visitor and maintenance access across the stream. The embankment would be hidden

from view by visitors at the maintained part of the site by the heavily treed area west of the Gravesite.

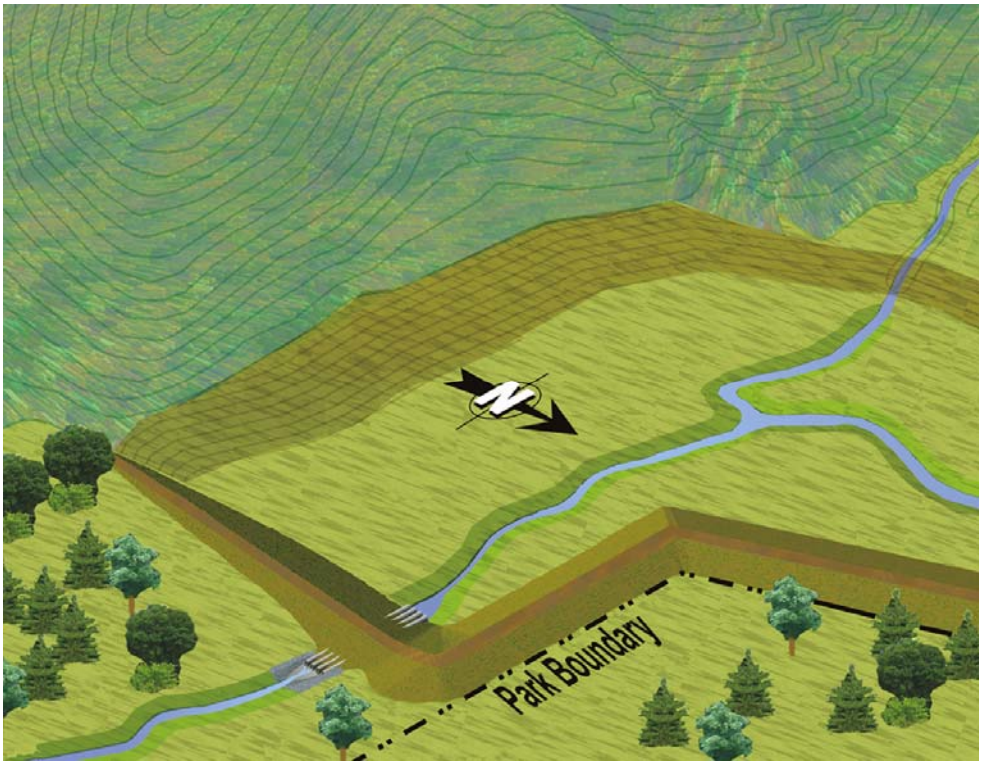

FIGURE 17. STORM WATER DETENTION BASIN CONCEPT

During extreme events, the storm water detention basin could reach a pool level height where effects to property owners upstream of Main Street would be a concern. The preliminary conceptual design determined the general extent and magnitude of action that would be required to meet the objectives of the project. Concerns of upstream flooding were included in conceptual design engineering, and the approximate elevations and storage presented here were not shown to cause upstream flooding in preliminary analysis. However, preliminary analysis did not incorporate detailed hydraulic analyses of the North Tributary upstream of the Main Street Bridge. Detailed hydraulic analyses and engineering design for this location would be completed prior to implementation of the project. It is assumed that, if necessary, final detention basin design would be modified so that upstream flooding would not occur as a result of project implementation. If the design analysis were to show effects from the detention basin to property upstream of Main Street, then the design of the detention basin would be modified to eliminate this effect. Modifications that would lower the pool elevation include lowering the top of embankment elevation and excavating further into the hillside to the south or from the bottom of the basin to offset reduction in storage capacity. It is also possible that an effect of the detention basins on upstream property could be completely or partially eliminated by cleaning the North Tributary channel upstream of Main Street.

Four 6-foot diameter circular culverts would be installed to convey flows downstream into the creek channel and help guide floodwaters even in extreme events. The bottom of each culvert would be set at the same level as the channel bottom, with the outflow reinforced. The culverts would be somewhat masked by native vegetation growing on the embankment. This would allow the basin to drain freely, detaining inflows only for brief periods (see Figure 18).

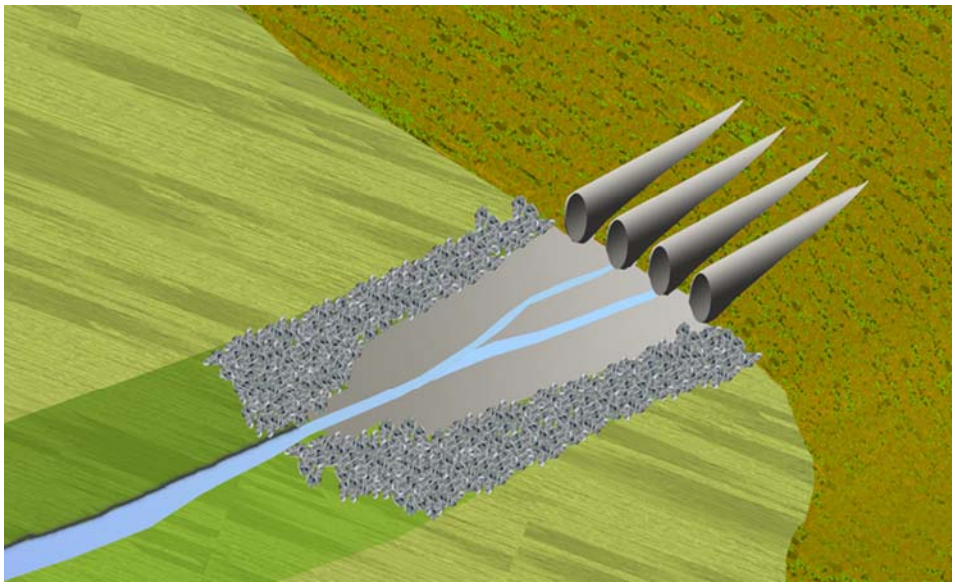

FIGURE 18. CULVERTS EXITING BASIN INTO HOOVER CREEK

The use of upstream detention storage would effectively reduce the peak discharges leaving the detention basin. Peak flows that occur under existing conditions and those that would occur when the upstream areas outside of the park are fully developed are presented below in Table 5. In addition, the table also shows a comparison between these peak flows and the reduction that would occur by creating a 67-acre-foot detention site.

TABLE 5. FLOOD FREQUENCY OF FLOWS LEAVING THE 67-ACRE-FOOT DETENTION SITE

Return Period	Existing Condition	Future Development with 67 acre-feet of Detention
(Yr)	(cfs)	(cfs)
100	2,053	1,712
50	1,720	1,347
25	1,501	1,050
10	1,204	849
5	994	753
2	691	601

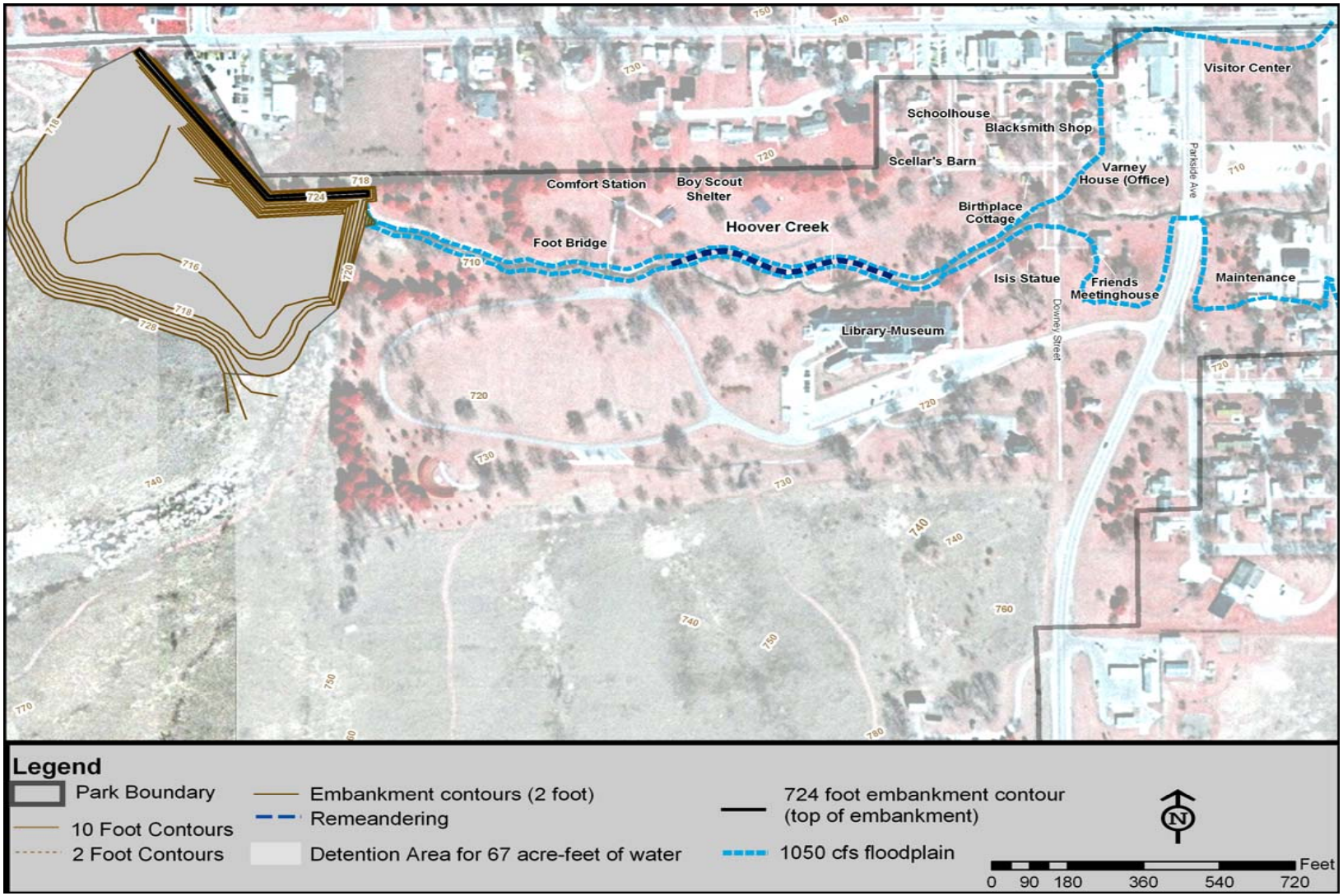

FIGURE 19. ALTERNATIVE D

During precipitation events of greater magnitude than the 25-year storm, the detention basin would reach capacity. Storm water would then overtop the embankment and spill into the stream channel. During such an event, the park would implement their flood emergency plan and take actions appropriate to protect park resources. During such flows, the flood boundary illustrated for the 25-year flood event would be exceeded (Figure 19). The total extent of flooding would be dependent on the intensity and duration of the individual runoff event.

As described for elements common to all action alternatives, typical excavation and construction methods would be used to install the detention basin. The time period needed for completion of the basin and channel configuration would be 3 to 6 months. Mitigation measures to protect resources are found in Table 7.

By constructing the 67-acre-foot detention basin, park resources, with the exception of the Visitor Center and maintenance facility, can be protected from flood damage up to a 25-year storm event.

Recreation Stream Management Unit

Installation of the designed channel, clearing the channel of debris, installation of a storm water management unit, and preservation of the pedestrian bridge and stream gauging station would take place. The protection afforded by reducing 25-year flows to 1,050 cfs eliminates the requirement for further, building-specific actions.

Historic Core Stream Management Unit

This unit would retain its manicured appearance and receive the new channel template, remeandering, and planting of low profile vegetation. The historic retaining wall on the south creek bank would be reconstructed after installation of the channel template. The open view from the Birthplace Cottage to the Gravesite would be maintained.

The location of the Friends Meetinghouse, just east of the Downey Street Bridge, is subject to inundation by backwater from the west branch of the Wapsinonoc. Because the park is limited in its ability to decrease these backwater effects, the existing flood-protection measures would be maintained to provide protection from floods.

Village Green Stream Management Unit

The elements common to all action alternatives would be implemented to provide about 1,050 cfs channel capacity in Hoover Creek and improved storm water quality for resource protection. However, the backwater effects from high water in the west branch of the Wapsinonoc would persist.

Much of the flood effects at the Visitor Center are attributable to pooled backwater from the west branch of Wapsinonoc Creek. Given that the Hoover Creek 25-year event would likely result in high flows and therefore extensive backwater ponding, the Visitor Center would be threatened by such an event. Thus, the waterproof door shields described for Alternative B would also be installed under this alternative. These shields would provide protection from the 50-year flood for the Visitor Center.

Backwater effects at the maintenance yard would continue to cause flooding at an average rate of more than once every 5 years. Because floor elevations of the permanent structures are inundated during 9-year or greater events and the park's long-term goal is to relocate these facilities, the park would provide no additional flood protection at this site. Equipment would continue to be moved during high water, and open-air storage of materials would be limited to those that are not subject to damage by flood waters.

ALTERNATIVE E: PROVIDE 50-YEAR FLOOD PROTECTION, THE PREFERRED ALTERNATIVE

As with all the action alternatives, this alternative would include changes to the stream channel dimensions, remeandering, and installation of a grade control structure to control down-cutting. This alternative would also include construction of a detention basin in the upstream reaches of Hoover Creek, similar to Alternative D. However, in order to achieve 50-year flood event protection, the detention basin capacity would be expanded to 138 acre-feet. As in Alternative D, the flow rate of discharges from the storage basin into the creek channel would be reduced to 1,050 cfs. Therefore, additional site-specific protection measures would be the same as those described for Alternative D.

The costs, including excavation, construction, contingencies, revegetation, and flood protection, have been estimated at $1.8 million. Flood preparation and damage costs described in previous alternatives would be avoided up to the 50-year flood event.

Channel Characteristics

This alternative includes the 1,050 cfs channel design, remeandering, vegetation removal, and stabilization with appropriate vegetation proposed for all action alternatives.

Prairie Stream Management Unit

The embankment for the larger, 138-acre-foot (45 million gallon) basin would be located east of the confluence of the north and west tributaries. The total excavation for this option is about 175,000 cubic yards and would disturb approximately 14 acres. The constructed basin would have sloped sides, be vegetated with appropriate plant materials, and would not detain water other than during high flows.

Similar to Alternative D, the proposed embankment would be set at 720 feet in elevation, 12 feet high (from creek channel bottom to top of embankment), 10 feet wide at the top, 106 feet wide at the bottom, and would have upstream and downstream face slopes of 4 to 1. Unlike Alternative D, the bottom of the detention area would be excavated to about the 710-foot contour, removing much of the existing tributary channels, but providing much more efficient attenuation of the incoming peak flow. The embankment would be hidden from visitors' view at the maintained part of the site by the wooded area west of the Gravesite.

As described in Alternative D, during extreme events the storm water detention basin could reach a pool level where effects to property owners upstream of Main Street would be a concern. Upstream flooding concerns were included in engineering of the conceptual design, and the approximate elevations and storage presented here were not shown to cause upstream

flooding in preliminary analysis. However, preliminary analysis did not incorporate detailed hydraulic analyses of the North Tributary upstream of the Main Street Bridge. Detailed hydraulic analyses and engineering design for this location would be completed prior to implementation of the project. It is assumed that, if necessary, final detention basin design would be modified so that upstream flooding would not occur as a result of project implementation. If the design analysis were to show an effect of the detention basin to property upstream of Main Street, then the design of the detention basin would be modified to eliminate this effect. Potential modifications are the same as described in Alternative D.

In the event that all topsoil is removed from the basin and underlying soil layers exposed, excavated topsoil would be banked. At least 2 feet of topsoil would be replaced to ensure support of a vegetative community and to protect groundwater resources. Because the excavated soil would have multiple uses, its final disposition would be evaluated to assess any cost reductions due to trade or reuse of the soil. Some of the excavated material would be suitable for constructing the embankment and other portions could be used to berm along the north side of the detention area to provide additional flood protection for the adjacent private property developments.

Four 6-foot diameter circular culverts would be installed to direct water into Hoover Creek. The bottom of each culvert would be set at the same level as the channel bottom, with the outflow reinforced (Figure 20). This would allow the basin to drain freely, detaining inflows only for brief periods. Just as in Alternative D, installation of a hardened surface on the embankment top could provide an emergency spillway for overtopping and could be used to provide visitor and maintenance access across the stream.

As outlined in the Table 6, the 138-acre-foot detention basin would provide a very high level of protection, and would allow the 1,050 cfs capacity channel design to contain flows approximating the 50-year flood event.

During precipitation events of greater magnitude than the 50-year event, the detention basin would reach capacity. As described for Alternative D, storm water would then overtop the embankment and spill into the stream channel. During these rare events, the park would implement its flood emergency plan and take actions appropriate to protect park resources. During such flows, the flood extent would be exceeded. The total extent of flooding would be dependent on the intensity and duration of the storm event.

Recreation, Historic Core, and Village Green Stream Management Units

Under this alternative, the Friends Meetinghouse, Visitor Center and maintenance facility would be the only locations threatened due to the back flooding of Wapsinonoc Creek, which would be expected to continue at frequent rates. As described in Alternative D, existing protective measures as the Friends Meetinghouse would be maintained and the Visitor Center would receive waterproof door shields that would provide 50-year protection. At the maintenance facility, the park would take no additional action due to their longer-term goal of moving the maintenance facility functions to a new location.

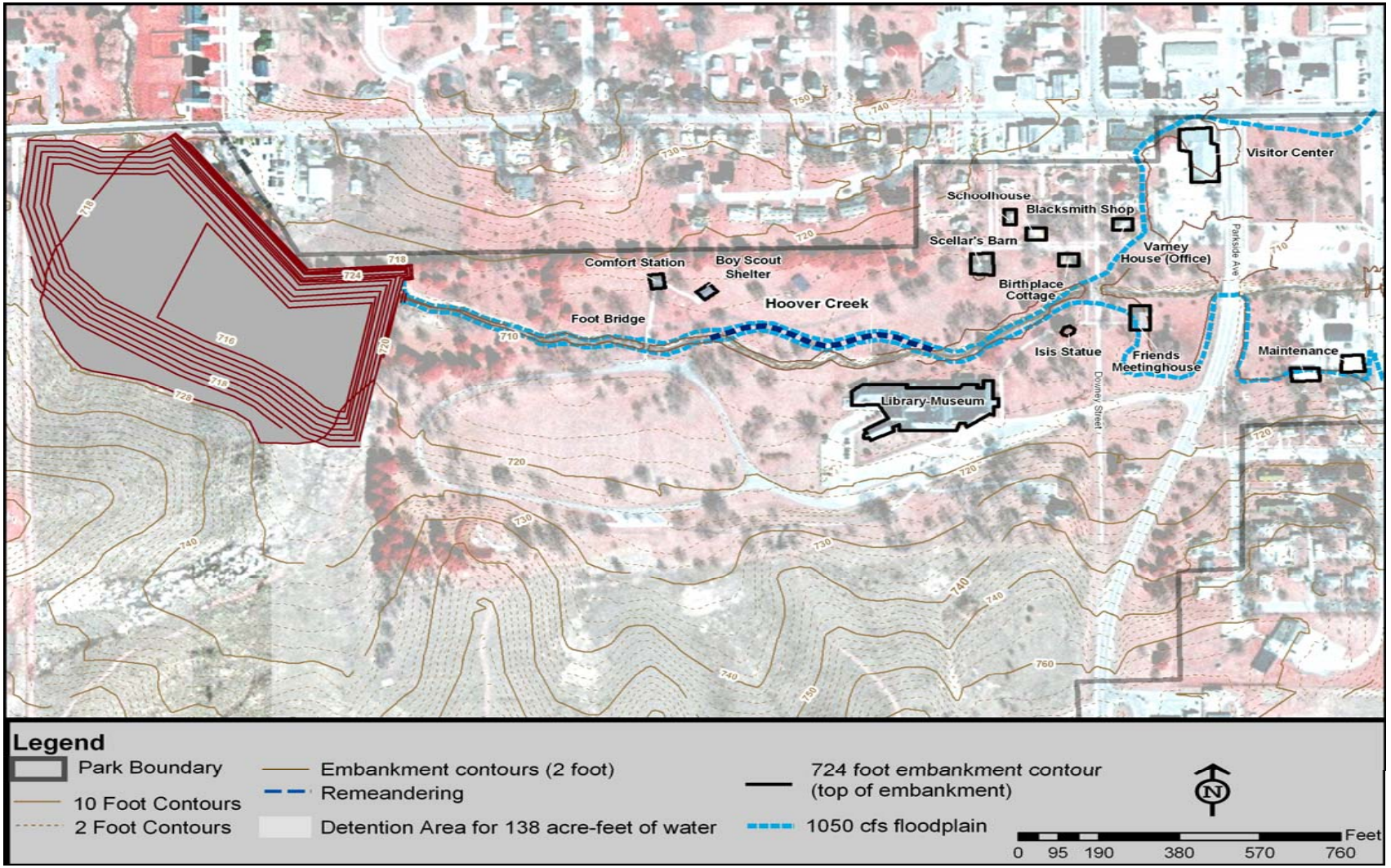

FIGURE 20. ALTERNATIVE E

TABLE 6. FLOOD FREQUENCY TABLE OF FLOWS LEAVING THE 138-ACRE-FOOT DETENTION SITE

Return Period	Existing Condition	Ultimate Development with 138 acre-feet Detention
(Yr)	(cfs)	(cfs)
100	2,053	1,538
50	1,720	1,050
25	1,501	872
10	1,204	725
5	994	614
2	691	429

MITIGATION MEASURES OF THE ACTION ALTERNATIVES

Under all action alternatives, best management practices and mitigation measures would be used to prevent or minimize potential adverse effects associated with the project. These practices and measures would be incorporated into the project designs and plans.

Resource protection measures would include, but would not be limited to, those in Table 7. The impact analyses in "Environmental Consequences" (Chapter 4) were performed assuming that these best management practices and mitigation measures would be implemented as a part of the action alternatives.

TABLE 7. MITIGATION MEASURES OF THE ACTION ALTERNATIVES

Topic	Resource Protection Measure	Responsible Party
Cultural Resources		
	All work would be done in a manner consistent with the *Secretary of the Interior's Standards and Guidelines for Archeological Documentation,* and work would follow provisions outlined in the April 2006 Programmatic Agreement between the National Park Service and the Iowa State Historic Preservation Officer (see Appendix F). These provisions include but are not limited to the following: • Before implementation of the preferred alternative, the National Park Service would develop an archeological testing and inventory plan for areas likely to be impacted by the undertaking. • Prior to ground-disturbing activities and following the testing and inventory plan, appropriate Phase I archeological investigations (intensive pedestrian survey) and controlled collecting would be conducted. • Phase II testing would be conducted as appropriate to identify any previously unknown archeological resources. Testing would take into consideration the potential for changes in design or project area of potential effect.	NPS

TABLE 7. MITIGATION MEASURES OF THE ACTION ALTERNATIVES (CONT)

Topic	Resource Protection Measure	Responsible Party
	Any identified resources would be evaluated under National Register criteria, and, in consultation with the Iowa SHPO, appropriate choices would be made for resource preservation and protection.	Contractor
	If necessary, additional mitigation measures would be developed in consultation with the SHPO. Mitigation measures would be developed and would be cognizant of resource significance and preservation needs. These measures could include such provisions as changes in project design and/or archeological monitoring of the project and data recovery.	NPS
	If need be, a memorandum of agreement would be written prior to development of the final design documents. Known archeological sites in the project area would be flagged for avoidance, or archeological data recovery would be conducted where sites could not be avoided..	NPS
	A data recovery plan would be submitted to the SHPO for review and comment prior to commencement of field work.	NPS
	Data recovery would be conducted by an archeologist meeting the Secretary of the Interior's Standards and would follow the Advisory Council on Historic Preservation's (ACHP) *Recommended Approach for Consultation on the Recovery of Significant Information from Archaeological Sites* (64 FR 27085-27087).	NPS
	Prior to completion of final project designs, the park and design team would consult with an archeologist meeting the Secretary of the Interior's standards to clarify construction schedules and sequences, review the status of known archeological and historic resources, and develop a plan for archeological monitoring of ground-disturbing site work, including clearing, topsoil removal, excavation for meanders and flood detention, landscaping activities, and construction of temporary facilities such as coffer dams.	NPS and Contractor
	Construction would be archeologically monitored by an archeologist meeting the Secretary of the Interior's standards.	NPS and Contractor
	If prehistoric or historic archeological resources are discovered during any portion of the proposed action, work in the area associated with the find would cease until evaluated by an archeologist meeting the Secretary of the Interior's standards.	NPS and Contractor
	Procedures outlined in 36 CFR 800 would be followed for inadvertent discoveries, potentially including relocation of the work to a non-sensitive area to avoid further disturbance to the site until the significance of the find can be evaluated; further consultation would be conducted as appropriate.	NPS and Contractor
	Discovered resources would be evaluated for their potential National Register of Historic Places significance, and, if needed, mitigation measures would be developed in consultation with the Iowa SHPO.	NPS

TABLE 7. MITIGATION MEASURES OF THE ACTION ALTERNATIVES (CONT)

Topic	Resource Protection Measure	Responsible Party
	Tight construction limits would be established so that known archeological resources were avoided during ground-disturbing work.	NPS and Contractor
	To reduce unauthorized collecting from areas, • Work crews would be educated about the sensitivity and importance of cultural sites, and about need to protect any cultural resources encountered. • Work crews would be instructed of the illegality of collecting artifacts on federal lands (Archeological Resources Protection Act). • In advance of ground disturbing activities, instructions would be given regarding respectful treatment of human remains, and notification of the appropriate personnel in the event such remains are discovered.	NPS and Contractor
	Designs and materials used for the grade control structure would be chosen to be compatible with the cultural landscape and the historic nature of the area.	NPS and Contractor
	Work on the historic walls along Hoover Creek and treatments for historic structures would be conducted in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties.	Contractor
	Prior to work on the historic walls, these features would be photographed, measured, mapped, and described in a manner that would meet the Secretary's Standards.	NPS
	While working near the historic walls, care would be taken to avoid undermining their structural stability.	Contractor
	Prior to any channel modifications in this area, the walls would be carefully disassembled, and usable stone would be salvaged for use in rebuilding the structures.	Contractor
	The walls would be reassembled in accord with their original design and construction techniques, using original and matching materials, so that the finished project resembles the original as closely as possible.	NPS and Contractor
	Landscaping materials would be carefully chosen to be compatible with the historic landscape as well as their suitability for the individual area and meet the CLR.	NPS
	To minimize ground disturbance, all staging areas, materials stockpiling, vehicle storage, and other construction-related facilities and areas would be located in a previously disturbed area or on hardened surfaces, preferably outside of the park.	Contractor
Water Resources		
	Any excavation would take place in the dry months of fall, when significant precipitation is seasonally unlikely.	Contractor

TABLE 7. MITIGATION MEASURES OF THE ACTION ALTERNATIVES (CONT)

Topic	Resource Protection Measure	Responsible Party
	An adequate hydrocarbon spill containment system would be available on site in case of unexpected spills in the project area.	Contractor
	To prevent soil from eroding and depositing into water sources: • Stored topsoil would be surrounded by silt fencing and overtopped by semi-permeable matting anchored together to prevent siltation from heavy runoff during rainstorms or snowmelt. • Stockpiling of materials would occur on pavement or in areas previously disturbed.	Contractor
Visitor Understanding and Appreciation		
	The park would publicize updated progress reports, anticipated schedules of any construction work occurring in the park, and notice of any closures or restrictions via the local newspaper, park webpage, and informational pamphlets which would be made available in the park Visitor Center and Presidential Library-Museum.	NPS
Public Health and Safety		
	Park staff would monitor contractor activities to ensure compliance with safety standards.	NPS
	To protect visitor and staff safety during construction activities, traffic flow control, signage and flagging would be provided.	Contractor
	The contactor will prepare a project safety plan, and submit it to the NPS for approval prior to commencing construction. Elements to be addressed in the plan include site access and restrictions, fencing and barriers, traffic safety measures, and identification of personnel responsible to oversee and enforce project safety measures.	NPS and Contractor
Soils and Vegetation		
	To minimize disturbance to the surrounding prairie and landscape, the construction limits would be fenced prior to beginning any work and would remain fenced until completion of the contract.	Contractor
	Plants that are not selected for removal during project design would be replaced if damaged by the proposed action.	Contractor
	To reduce the potential of topsoil losing its important biological components, topsoil would be stripped from within the construction limits and stockpiled in a designated staging area for use in revegetation efforts.	Contractor

TABLE 7. MITIGATION MEASURES OF THE ACTION ALTERNATIVES (CONT)

Topic	Resource Protection Measure	Responsible Party
	Imported soils and other materials (including quarry rock) would be specified sterile and weed free. Erosion control would be in the form of sterile matting. Only seeding of approved materials would be permitted. To prevent accidental introduction of weed seed, only certified weed free straw bales would be used. Washing of heavy equipment would occur prior to importation to the park to minimize the potential for non-native or weed seed to be spread through the park. Such equipment would also be inspected regularly to ensure that no oil or fuel leaks are present that could result in contamination of the park environment.	Contractor
	Although disturbance associated with the stream rehabilitation project could introduce weed species, park staff would monitor the area to eradicate any exotic species that may become established in the park.	NPS
Wildlife		
	Construction would be scheduled to avoid breeding and fledging seasons.	NPS and Contractor
	A defined work area perimeter would be maintained to keep all construction-related impacts within the affected area and minimize adverse impacts to wildlife habitats.	Contractor
	Construction workers would be educated about the dangers of intentional or unintentional feeding of park wildlife, and on inadvertent harassment through observation or pursuit.	Contractor
	Construction would be expected to occur during daylight hours only. However, if night lighting ever became necessary on an isolated basis, lighting would be minimal, directed downward, and shielded.	Contractor

ENVIRONMENTALLY PREFERRED ALTERNATIVE

The environmentally preferred alternative is the alternative that will best promote national environmental policy expressed in the National Environmental Policy Act (NEPA). Section 101(b) of NEPA identifies six criteria to help determine the environmentally preferred alternative. The act directs that federal plans should:

(1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;

(2) assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings;

(3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;

(4) preserve important historical, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity and variety of individual choice;

(5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and

(6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

The environmentally preferred alternative would cause the least damage to the biological and physical environment, and would best protect, preserve, and enhance historical, cultural, and natural resources. Alternative E, the Preferred Alternative, is also the Environmentally Preferred Alternative in its ability to best meet the six national environmental goals.

(1) All of the action alternatives would meet goal 1 as they would restore Hoover Creek's ability to function properly over the long term. The No Action Alternative would fail to restore Hoover Creek or protect park resources and would not meet this criterion.

(2) All of the action alternatives would improve public health and safety by stabilizing the stream channel, eliminating risks associated with steep, unstable stream banks, reduce exposure to contaminated water from reduced flood frequency, and restore the cultural landscape to a more aesthetically and culturally pleasing surrounding. Alternatives D and E would do more to meet this goal by increased reduction of bacterial contamination and reduced sediment loading, with the greatest benefits occurring under Alternative E. Alternative A does not meet this criterion because of continued health and safety risks and persistence of a degraded stream channel that is not aesthetically or culturally pleasing.

(3) All of the action alternatives meet goal 3 to some degree and have temporary adverse effects on natural resources with long-term benefits for natural and cultural resources, without degradation or risks to health and safety. Although Alternative E has the greatest level of short-term disturbance to natural resources, it provides the best long-term benefit of cultural resource protection and enhanced wildlife habitat with increased biodiversity. The No Action Alternative does not fulfill goal 3 because stream degradation and health and safety risks would persist.

(4) The primary purpose of this project is to reduce the impacts of flooding on cultural resources and historic structures. The degree of flood protection and preservation of cultural resources and historic structures increases or improves with each succeeding alternative with Alternative E providing the greatest level of protection and preservation. Alternative A would not meet this goal because important cultural resources would continue to be at risk.

(5) All of the action alternatives would provide a higher level of amenities and standard of living because they would increase opportunities for recreation (walking, hiking, picnicking, nature study, etc.) by decreasing the impacts of floods. Alternative E would best meet goal 5 by offering the greatest protection of park resources. Alternative A would not meet this goal because park resources would continue to be adversely affected with future development.

(6) All of the action alternatives meet goal 6 in that they would improve the function of natural resources along the stream corridor, reduce invasive plant species, and reestablish native grasses and forbs. Alternative A would not enhance the quality of renewable resources and would allow further degradation so would not meet this

criterion. None of the alternatives propose a long-term change in use of depletable resources; therefore, no discernable difference exists between the alternatives for this factor.

ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

Analysis of all design options led to the dismissal of several alternatives. These alternatives included components that failed to meet the project objectives, actions that generated unacceptable levels of resource impacts, or actions that were generally unacceptable under the terms of alternative elimination found in Director's Order #12, Section 4.5.E.6. The nature of the dismissed features, and the rationale for their rejection, are outlined below.

Remove vegetation and maintain existing channel form and location. This alternative would maintain the existing creek channel alignment, remove bank vegetation, excavate the bank slopes to a ratio of 1.5 to 1 and place some riprap in the creek bed and bank bends. This alternative would increase the channel capacity of the creek to a native prairie 2.3-year flow, but it would not have offered ample enough protection of the park's cultural resources to fully meet this plan's objectives.

Levee construction along the creek banks. The park could receive additional protection if a 2-foot levee were installed along the creek that extended from the Library-Museum to the confluence with the west branch of the Wapsinonoc. This alternative would create an unacceptable level of adverse effect on the cultural landscape.

Raise the elevation of the channel bed. Under this alternative, the elevation of the stream channel would have been increased through the park. This would have required excavating and refilling the stream channel, and constructing a series of grade control structures to control future erosion. This option was deemed infeasible due to the disturbance, need for imported soil resources, and uncertain sustainability of an artificially-elevated stream channel.

Providing levee protection for the maintenance facility. A 2-foot levee along the south stream bank from Parkside Drive, east toward the park boundary was considered to provide approximately 20-year protection. Because this location is dominated by backwater effects from the west branch of the Wapsinonoc, installation of the levee would result in displacement of high water from this location to other sites. For example, higher flows could be expected on the north side of the creek in the parking area and Village Green and potentially at the Visitor Center and downstream private landowners. The ripple effects of implementing this alternative made it undesirable.

Provide 100-year flood protection. The 100-year flood event is a common level of protection integrated into floodplain management. However, the park is faced with constraints such as size limitations for potential detention storage and protection of the cultural landscape and viewshed within the park. The highly-engineered provisions that would be necessary to provide comprehensive protection of this magnitude would have unacceptable levels of resource impacts on the landscape, historic structures, and the overall visitor experience.

SUMMARY AND COMPARISON OF THE ALTERNATIVES

The tables below summarize the elements of the alternatives being considered. Table 8 outlines the components of the alternatives to provide a comparison of the actions under consideration. Table 9 compares how the different alternatives meet the objectives of the plan that were detailed in "Purpose of and Need for Action". Table 10 summarizes the anticipated impacts of the alternatives on park resources and values.

Table 8 compares the components of the alternatives and provides a quick way to compare the actions necessary to implement the various levels of flood protection described for the alternatives.

TABLE 8. COMPARISON OF THE ELEMENTS OF EACH ALTERNATIVE

Elements/Actions	Alternative A – No Action / Continue Current Management	Alternative B – Provide 10-Year Flood Protection	Alternative C – Provide 15-Year Flood Protection	Alternative D – Provide 25-Year Protection	Alternative E – Provide 50-Year Protection
Main channel adjustments	No channel adjustments or modifications performed.	1,050 cfs capacity channel configuration installed for a distance of about 2,000 linear feet, to include 500 feet of remeandering, grade control structure, and replacement of dense vegetation with low-profile plant cover.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
Upstream modifications	No upstream modifications created.	North and west tributaries modified with new channels designed to correspond to 1,050 cfs capacity of Hoover Creek; includes excavating, clearing debris and vegetation, and stabilized with grass.	Same as Alternative B.	Increase naturally occurring storage capacity from 37 acre-feet to 67 acre-feet by constructing a storm water detention basin at the confluence of the north and west tributaries in Prairie Stream Management Unit.	Increase naturally occurring storage capacity from 37 acre-feet to 138 acre-feet by constructing a storm water detention basin at the confluence of the north and west tributaries in Prairie Stream Management Unit.
Rehabilitation of historic wall upstream of Downey Street Bridge	No rehabilitation provided.	Wall rehabilitated in same location using original materials.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

TABLE 8. COMPARISON OF THE ELEMENTS OF EACH ALTERNATIVE

Elements/Actions	Alternative A – No Action / Continue Current Management	Alternative B – Provide 10-Year Flood Protection	Alternative C – Provide 15-Year Flood Protection	Alternative D – Provide 25-Year Protection	Alternative E – Provide 50-Year Protection
Parking area storm water management measures	No storm water management measures would be installed.	Underground oil-water separators or small storm water management ponds would be installed in the Recreation and Village Green Stream Management Units to improve parking lot runoff water quality.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
Protection of Scellar's Barn	No protection provided.	Floor elevation is above the 20-year flood elevation, no additional protection would be required under this alternative.	Add waterproofing of foundation to enhance existing protection.	No additional protection, such as waterproofing, would be necessary because of reduced flooding extent	Same as Alternative D.
Protection of the Library-Museum	No additional protection provided Protection measures for sensitive resources (i.e. relocation to higher ground) in the event of flood would continue.	Waterproof foundation, which would provide approximately 25-year protection because first floor is elevated well above first contact level.	Same as Alternative B.	No additional protection, such as waterproofing, would be necessary because of reduced flooding extent.	Same as Alternative D.

TABLE 8. COMPARISON OF THE ELEMENTS OF EACH ALTERNATIVE

Elements/Actions	Alternative A – No Action / Continue Current Management	Alternative B – Provide 10-Year Flood Protection	Alternative C – Provide 15-Year Flood Protection	Alternative D – Provide 25-Year Protection	Alternative E – Provide 50-Year Protection
Protection of the Friends Meetinghouse	Maintain existing protection, including: drainage tiles with passive drainage to creek, backflow prevention, external mastic sealant on basement walls, sump and pump.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
Protection of the Visitor Center	No additional protection provided.	No additional protection necessary; floor level equals 10-year event elevation.	Install waterproof entrance shields, which would provide protection for the 50-year event.	Same as Alternative C.	Same as Alternative C.
Protection of maintenance facility	No additional protection provided. Temporary relocation of equipment and sandbagging measures would continue when flooding is imminent.	No additional protection; floor elevations at 9-year event flow; park will accept this risk with long-term goal of relocating the facilities. Evacuate equipment when flooding is imminent.	Waterproof permanent structures. Install waterproof entrance shields. Evacuate equipment when flooding is imminent.	Same as Alternative B.	Same as Alternative B.

Table 9 shows the ability of the five alternatives to meet the project objectives. This provides a way to quickly compare and contrast the degree to which each alternative accomplishes the purpose or fulfills the need identified in Chapter 1.

TABLE 9. ABILITY OF THE ALTERNATIVES TO MEET PLAN OBJECTIVES

Objective	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
Reduce flood threat and flood damage to historic structures and other cultural resources.	Fails to meet this objective as flood damage and threat are not reduced.	Provides minimal improvement in reducing flood threat for frequent events of relatively low magnitude.	Provides modest improvement in reducing flood threat from relatively uncommon events of moderate magnitude.	Better meets objective by providing protection for all historic structures and the Library-Museum for relatively uncommon events, up to and including the 25-year flood.	Best meets objective by providing protection for all historic structures and the Library-Museum for uncommon floods of great magnitude, up to and including the 50-year event.
Reduce the frequency at which flood events occur within the park by increasing the stream's flow capacity.	Fails to meet this objective as stream flow capacity remains unchanged, with a capacity of 315 to 650 cfs.	Minimally meets objective by increasing the channel capacity to convey flows in excess of the 5-year event.	Same as Alternative B.	Better meets the objective by installing upstream detention which allows the stream channel to convey all flows up to the 25-year event, thereby reducing the flood frequency in the park.	Best meets the objective by installing upstream detention which allows the stream channel to convey all flows up to the 50-year event, dramatically reducing the flood frequency in the park.
Stabilize banks and reduce entrenchment and lateral cutting of stream.	Fails to meet this objective because stream function and condition would continue to degrade.	Meets this objective by installing a designed channel, including grade control, to greatly reduce or eliminate entrenchment and down-cutting.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

TABLE 9. ABILITY OF THE ALTERNATIVES TO MEET PLAN OBJECTIVES

Objective	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
Enhance the commemorative nature of the park by returning the stream corridor to a more historic appearance.	Fails to meet this objective because current degraded appearance of the stream corridor would persist.	Meets the objective by installing a designed stream channel based on the 1930s-1950s appearance of the corridor as "a prairie with a stream running through it".	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
Implement modern, sustainable riparian management techniques.	Fails to meet this objective as steep stream banks restrict access and management activities in the riparian corridor.	Meets the objective by installing a channel designed to meet park management and maintenance needs.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.
Provide safe, stable stream banks from which visitors can observe the stream and riparian area.	Fails to meet this objective because high erosion and down-cutting would continue to produce bank instability.	Meets this objective by stabilizing the stream bank, without encouraging creek entry or direct contact by visitors.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

Table 10 provides a brief summary of the effects of each of the alternatives on the impact topics that were retained for analysis. More detailed information on the effects of the alternatives is provided in "Environmental Consequences" (Chapter 4).

TABLE 10. SUMMARY OF CONCLUSIONS BY ALTERNATIVE

Cultural Resources	
Alternative A	There would be long-term, minor to moderate, localized, adverse effects on archeological resources from continued bank erosion. Recurrent flooding would result in long-term, negligible to moderate, localized, adverse effects on historic resources. The cultural landscape would be subject to short- and long-term, negligible to moderate, parkwide, adverse effects from flood damage. The risk of damage to collections during emergency relocation would create long-term, minor to moderate, localized, adverse effects to collections.
Alternative B	Construction activities would produce long-term, negligible to moderate, localized, adverse effects on archeological resources and short-term, localized, minor, adverse effects on the cultural landscape. In some areas, the slowed rate of bank erosion would create long-term, moderate benefits. Flood events would have long-term, localized, negligible to moderate adverse effects on some historic structures. Flood protection measures and stream improvements would have long-term, localized, moderate benefits to collections and furnishings.
Alternative C	Effects on archeological resources, historic structures, and the cultural landscape would be the same as described for Alternative B. There would be long-term, minor, localized benefits to non-historic structures. Long-term, moderate, localized benefits on collections and furnishings would occur from eliminating the risk of flood or relocation damage.
Alternative D	There would be a long-term, localized, negligible adverse effect on archeological resources in the floodwater detention area. Channel improvements would generally produce both long-term, minor, adverse effects and long-term, moderate benefits, but if testing or construction monitoring reveals the presence of National Register-eligible archeological resources in either the floodwater detention area or in the historic core area, the effects would be long-term, moderate, and adverse. Restoration of the historic ambiance would create long-term, parkwide, moderate benefits, while ponding would cause some short-term, minor, adverse effects. Flood protection would produce long-term, moderate, localized, beneficial effects for historic structures, the cultural landscape, and the park collections. Creation of a detention area would have negligible effects on the cultural landscape, while vegetation and soil removal would cause short-term, minor, adverse effects.
Alternative E	Effects on archeological resources, historic structures, and collections would be the same as described for Alternative D, with the added benefits of greater flood protection from the larger detention basin. Effects to the cultural landscape would be the same as described for Alternative D, except there would be long-term, negligible, localized, adverse effects from the increased detention basin area.
Water Resources	
Alternative A	There would be long-term, moderate, localized, adverse effects to stream function from persistent degraded channel conditions and long-term, minor, localized, adverse effects to water quality from continued erosion. There would be no effect on floodplain resources or values.

TABLE 10. SUMMARY OF CONCLUSIONS BY ALTERNATIVE

Alternatives B and C	There would be long-term, moderate, localized, beneficial effects to stream function from channel improvements and increased stability. There would also be long-term, negligible to minor, localized, beneficial effects to water quality from reduced erosion. Long-term, adverse effects to floodplain resources resulting from decreased flood frequency would be negligible. During and immediately following construction, short-term, localized, adverse effects to stream function and water quality would range in intensity, and could range up to moderate if large precipitation events occur before vegetation fully establishes.
Alternatives D and E	These options would provide long-term, moderate, localized, beneficial effects to stream function, as the stream channel would be stable through even large storm events. There would be corresponding long-term, minor, localized, beneficial effects to water quality from reduced erosion. Long-term, negligible, localized, beneficial effects to floodplain resources would result from reduced flood frequency. Short-term effects from construction would be the same as those described for Alternatives B and C.
Visitor Understanding and Appreciation	
Alternative A	There would be long-term, moderate, localized, adverse effects from potential flood damage, offset by continued maintenance of existing flood protection. Restricted access after flooding would continue to cause short-term, moderate, localized, adverse effects.
Alternative B	Enhanced appreciation of the cultural landscape and increased resource protection would produce long-term, negligible to minor, parkwide, beneficial effects. 10-year flood protection and preservation of the viewshed would result in long-term, minor, localized, beneficial effects. Risking loss of resources in larger flood events would cause long-term, moderate, localized, adverse effects. Rehabilitation of the historic retaining wall would create long-term, negligible to minor, localized, beneficial effects. There would be short-term, minor, localized, adverse effects from restricted access during construction.
Alternative C	There would be long-term, minor to moderate, localized, beneficial effects from enhanced appreciation of the cultural landscape, increased resource protection, and preservation of the viewshed. Waterproofing the foundation of Scellar's Barn and waterproof shields on the Visitor Center would create long-term, minor, localized, beneficial effects, though access restrictions during this work would cause short-term, minor to moderate, localized, adverse effects. Construction of the designed channel and rehabilitation of the historic wall would result in long-term, negligible to minor, localized, beneficial effects, while construction-related access restrictions would cause short-term, minor, localized, adverse effects.
Alternative D	There would be long-term, moderate, localized, beneficial effects from enhanced appreciation of the cultural landscape, increased resource protection, and preservation of the viewshed. The added protection from the detention basin would produce short- and long-term, negligible to minor, localized, beneficial effects. Visual intrusion from the culverts would present short-term, negligible, localized, adverse effects. Construction-related access restrictions would cause short-term, moderate, localized, adverse effects.

TABLE 10. SUMMARY OF CONCLUSIONS BY ALTERNATIVE

Alternative E	There would be long-term, moderate, parkwide, beneficial effects from enhanced appreciation of the cultural landscape, increased resource protection, and preservation of the viewshed. This would involve short-term, minor, localized, adverse effects from access restrictions. The added protection from the detention basin would produce short- and long-term, minor to moderate, localized, beneficial effects. Construction noise and visual intrusions from culverts would create short- and long-term, negligible to minor, localized, adverse effects.
Public Health and Safety	
Alternative A	There would be long-term, minor, parkwide, adverse effects to public health and safety. Short-term, negligible, parkwide, adverse effects would occur when park staff relocate equipment during flood events.
Alternatives B and C	These options would produce long-term, minor, parkwide, beneficial effects by reducing slip and fall hazards along the stream banks. Long-term, minor, parkwide, adverse effects would result from exposure to contaminated stream water. Construction activities and the relocation of equipment would produce short-term, negligible, localized, adverse effects.
Alternatives D and E	Effects from these options would be the same as described for Alternative B, except the risk of exposure to contaminated stream water would be long-term, negligible, parkwide, and adverse. Reduction in bacteria levels would be long-term, minor, local, beneficial effects.
Park Operations	
Alternative A	There would be short- and long-term, minor effects to park operations. Ongoing maintenance activities would result in long-term, negligible, localized, adverse effects. Emergency response duties and post flood mitigation tasks would continue to create short-term, minor, parkwide, adverse effects.
Alternatives B and C	There would be long-term, minor, parkwide, beneficial effects due to the elimination of staff duties related to 10- and 15-year flood events. Improvements to vegetation in the stream channel would create long-term, negligible, localized, beneficial effects, but maintenance of the channel improvements and waterproofing would present long-term, localized, negligible, adverse effects. Construction management tasks would present short-term, minor, localized, adverse effects.
Alternatives D and E	Effects of these options would be similar to those described for Alternatives B and C, with added long-term, moderate, parkwide, beneficial effects from attaining 25- and 50-year flood protection. Additional maintenance activities associated with the culverts and spillway for the detention area would add long-term, negligible, localized, adverse effects. Effects of maintaining the waterproofing and short-term effects related to construction activities would be the same as in Alternatives B and C.
Soils	
Alternative A	There would be long-term, minor, localized, adverse effects from continued downward incision and erosion. There would continue to be short-term, negligible, localized, adverse effects from the compaction of soils when using maintenance equipment.

TABLE 10. SUMMARY OF CONCLUSIONS BY ALTERNATIVE

Alternatives B and C	The channel improvements in these options would reduce erosion of soils and sedimentation, producing long-term, minor, localized, beneficial effects. Long-term, negligible, localized, adverse effects would result from the installation of impervious oil-water separators or detention ponds. Removal of some soils from the park would produce long-term, negligible, localized, adverse effects. Construction activities would have short-term, moderate, localized, adverse effects due to temporary soil disturbance.
Alternatives D and E	Effects would be similar to those described for Alternatives B and C, except that soil banking, reuse, and other disturbance of soils would produce a long-term, minor to moderate, localized, adverse effect. Permanent loss of soils for off-site use would have long-term, minor to moderate, localized, adverse effects. Increased soil moisture content would be a minor to moderate, localized, and beneficial effect.
Vegetation	
Alternative A	Long-term, minor, localized, adverse effects would result from the degradation of the stream bed. Normal vegetation management activities would not adversely affect park vegetation and in some cases may enhance growth and diversity.
Alternatives B and C	There would be long-term, minor, localized, beneficial effects from the reestablishment of the riparian vegetative community. Channel rehabilitation construction activities would produce short-term, negligible to minor, localized, adverse effects.
Alternative D	Effects would be the same as in Alternatives B and C, with an additional opportunity to remove exotic species and improve plant diversity, which would be long-term, minor, localized, beneficial effects. Construction work would be short-term, minor to moderate, and localized
Alternative E	Effects would be the same as in Alternative D, though the detention basin would cover a larger area.
Wildlife	
Alternative A	Long-term, negligible to minor, localized, adverse effects would occur from the habitat degradation caused by erosion and bank slumping. Short-term, negligible, localized, adverse effects to wildlife would result from normal park maintenance and visitor activities.
Alternatives B and C	These options would produce long-term, negligible to minor, localized, beneficial effects due to stabilization of the stream channel and creation of habitat. Short-term, negligible, localized, adverse effects to wildlife would result from normal park maintenance and visitor activities. Short-term, minor, localized, adverse effects would occur due to construction activities.
Alternative D	Long-term, minor, localized, beneficial effects would result from the increased habitat for species diversity provided by the detention basin. The short-term effects related to construction activities would be minor and adverse, considering the greater area of effect.
Alternative E	Alternative E would produce similar effects as Alternative D, with the addition of a larger enhanced habitat that would provide long-term, minor, localized, beneficial effects. Short-term effects due to construction activities would be short-term, moderate, localized, and adverse.

AFFECTED ENVIRONMENT

CULTURAL RESOURCES

Introduction

Cultural resources of concern for this final SMP/EIS include archeological resources, historic structures, cultural landscapes, and collections. The National Historic Preservation Act provides guidance for deciding whether cultural resources are of sufficient importance to be determined eligible for listing in the National Register of Historic Places (National Register).

The entire park is listed on the National Register as a National Historic Site and for conformance with Section 106, the area of potential effect would be the entire park. However, the affected environment and environmental consequences of this document will focus on those areas affected by the project (e.g., those areas where ground disturbance, changes in flooding patterns, or modifications to the cultural landscape would occur). The Birthplace Cottage, Friends Meetinghouse, Blacksmith Shop, and Gravesite are discussed under site significance.

Site History

Herbert Hoover was born to Jesse and Hulda Hoover in a small, two-room cottage on August 10, 1874. In 1879, the family moved into a larger home (now only an archeological site) south of Hoover Creek along Downey Street. In 1885, when the Hoover children were orphaned, Herbert was separated from his brother and sister and sent to live with relatives in Oregon.

The Birthplace Cottage (Figure 21), where Herbert Hoover was born, was sold in 1879 and it passed through several owners until its acquisition in 1889 by Port and Jennie Scellars. By the turn of the 20th century, a number of other structures had been erected along Downey and Poplar Streets in the vicinity of the birthplace. There was public interest in the Hoover birthplace by 1928, even before Hoover was elected president. When Hoover became president, his wife Lou Henry Hoover renewed efforts to purchase the Birthplace Cottage, but the owner, Jennie Scellars, continued to maintain the cottage until her death in 1934.

After acquiring the site from the Scellar heirs in 1935, the Hoovers began to develop the site for public use. Mrs. Hoover “embarked on a program to remove post-1885 features from the Birthplace” and return it to its 1874 appearance (NPS 1995a).

The Hoovers’ efforts to restore the cottage and its surroundings included acquisition of additional property to “square out the grounds” and selection of a site for a statue of the Egyptian goddess Isis across the creek from the Birthplace Cottage (NPS 1995a). The statue (Figure 22), “sculpted by Auguste Puttemans, was a gift of Belgian children, refugees, and soldiers to Herbert Hoover in gratitude for his World War I relief program” (NPS 1995a).

The Herbert Hoover Birthplace Society was formed in 1939. The Hoover family and birthplace society worked at landscaping and beautifying the grounds to create a setting they felt would be “evocative of Hoover’s boyhood” and suitable as a memorial to the president (NPS 1995b:1-1) (NPS 1995a).

FIGURE 21. RESTORED BIRTHPLACE COTTAGE – HERBERT HOOVER'S EARLY HOME

FIGURE 22. ISIS STATUE

In 1939, land west of the birthplace grounds was purchased to "obtain soil for regrading the land on both sides" of Hoover Creek (NPS 1995a). The area was regraded and landscaped using the plant varieties that President Hoover's mother had grown. In the early 1940s, the

Herbert Hoover Birthplace Society installed extensive ornamental plantings, many of which failed to survive along the creek (NPS 1995a).

The formal dedication of Herbert Hoover Birthplace Park occurred on June 30, 1952, and from about 1951 to 1964, development projects focused on "adapting the park for visitor use and convenience rather than historic restoration" (NPS 1995a). The Scellar's stock barn was converted into a garage and storage building. The loop road, built in the vicinity of the old race track, was constructed during the early 1950s, and the boundaries of the park were expanded by acquiring several small plots of land.

The Herbert Hoover Birthplace Foundation, Inc. was incorporated in 1954 to raise money to preserve Hoover's birthplace and the area around it and to plan for improvements to the site, including a small museum. In 1955, this foundation was incorporated to act on a national level to help support the Herbert Hoover Birthplace Society, which continued to administer the park (NPS 1995a).

In 1957, a typical blacksmith shop like that used by Jesse Hoover was constructed of recycled barn wood and placed farther from the Birthplace Cottage than the original (see Figure 23).

FIGURE 23. BLACKSMITH SHOP – RECREATING THE HOOVER FAMILY LEGACY

Work on the museum began in the late 1950s and the architectural firm of Eggers and Higgins of New York designed the original building, a modest limestone structure of just over 4,000 square feet that would hold the few token artifacts and copies of books that Hoover had intended to contribute. While the museum at West Branch was still under construction, Mr. Hoover made plans to expand it and to make it his Presidential Library.

Ground was broken for the West Branch museum on May 4, 1959, and the Federal General Services Administration took over administration of the building July 1, 1961. The Herbert Hoover Presidential Library was officially dedicated August 10, 1962, and the buildings and grounds were deeded to the United States on August 4, 1964.

Herbert Hoover died at the age of 90 in October of 1964. He was buried at the Gravesite, and his wife, who had died 20 years earlier, was reinterred beside him. Following the internments, work on the Gravesite continued under Wagner's guidance with plantings

"intentional and deliberately chosen for size and species." The idea of a symbolic vista, "the journey from birth to the grave", outlined by trees between the Birthplace Cottage and Gravesite, attributed to Allan Hoover, gained popularity. The Friends Meetinghouse was moved to the park and restored in 1964, and acquisition of additional properties and easements to protect the viewshed continued.

On June 23, 1965, the "Herbert Hoover Birthplace" was designated a National Historic Landmark. On August 12, 1965, the property was designated a National Historic Site, managed by the General Services Administration.

Beginning in 1967, the NPS acquired additional land to increase the size of the park and to provide visual buffers. The NPS also created a neighborhood setting from 1880 around the Birthplace Cottage by restoring, reconstructing, and relocating historic houses in the area. In 1970 and 1971, a Federal Building was constructed to accommodate the U.S. Post Office and the park's Visitor Center.

During the 1970s, the NPS began efforts to restore a native tallgrass prairie on formerly cultivated areas. This 81-acre site now has much of the historic appearance and some of the composition of the predominant vegetation type of the area prior to European settlement in the 1850s.

In the early days of settlement, the small stream that now bisects the site was little more than a grassy swale that occasionally drained excess surface water into the west branch of Wapsinonoc Creek. However, as the nearby prairies were cleared and planted, and the town was developed with buildings and streets, local runoff patterns changed. The swale became a small unnamed stream (designated as Hoover Creek in this final SMP/EIS). Over time, flooding caused the stream to cut downward and the steepened stream banks have repeatedly sloughed off in a cycle of bank erosion. Severe flooding in 1993 exacerbated the erosion problems and threatened some of the nearby historic sites and structures. The stream appears to be migrating laterally to the south, posing a threat to the Herbert Hoover Presidential Library-Museum, which is now just 50 feet from the stream channel.

Archeology

A file search for archeological sites was conducted by the Office of the State Archaeologist, University of Iowa, Iowa City, Iowa, in November, 2004. Additional site information provided by the 2005 Archeological Overview and Assessment indicates the presence of 17 archeological sites within the park; all of these sites exhibit Euroamerican components (Finney 2005). Fourteen of these sites are situated within the historic core area of the park, and most are associated with standing structures.

The park is rich in historical archeological features and artifacts because of the long period of human occupation. Although many of the original structures have been removed or replaced, and extensive modifications have been made to the ground surface, the density of occupation over the past 125 years suggests that archeological features are still present.

Over the years, numerous archeological investigations have been conducted, but no systematic park-wide survey has been completed. In 1970, excavations were carried out to locate the original Penn Street Trace and to find the foundation of Jesse Hoover's Blacksmith Shop. In 1971, Adrian D. Anderson excavated the archeological remains of the Blacksmith

Shop, uncovering 16 features, including parts of the foundation, forge, anvil area, coal shed, and areas associated with the wagon shop and horseshoeing activities (NPS 1973b).

In 1987, four features, including three cisterns and a trash pit, were uncovered and several areas, including the Birthplace Cottage and the Library-Museum, were tested, and an archeological base map was compiled (NPS 1988a). In 1991, test excavations were conducted around the Birthplace Cottage and along a proposed waterline route to the Library-Museum (NPS 1991b). A year later, a well was uncovered during trenching for renovation activities (NPS 1992b).

A flood damage assessment was developed by the NPS Midwest Archeological Center after the 1993 flood damaged materials and equipment in the maintenance building, inundated basements of historic structures, and eroded the banks of Hoover Creek (NPS 1993). Mitigation measures identified in this study have been included in Table 7. In 1996, excavations were conducted at the Library-Museum parking lot and along a proposed buried electric line (NPS Hunt 1996a, 1996c, and 1996d).

Structures Potentially Affected

Modern structures include the Federal Building, which houses the post office and Visitor Center; Library-Museum; comfort station; maintenance facility; and Scellar's Barn.

Historic structures include the Birthplace Cottage, Friends Meetinghouse, Blacksmith Shop, Schoolhouse, Isis Statue, and the Downey Street Bridge and adjacent stone retaining wall.

Birthplace Cottage, built in 1871, is a small, two-room, one-story, vernacular, wood-frame building with board and batten siding, situated along and facing Downey Street. The building retains much of the original material and appearance. It is the primary resource associated with the park.

The basement of this structure is modern, with full tiling and passive drainage to daylight, sump and pump, sealant coat, and ¼-inch-thick sheets of bentonite. The sump directs water to Hoover Creek, and has backflow prevention and adequate pressure to flow during high water. Passive tile conducts water to the creek and has a back flow preventer.

Friends Meetinghouse was built in 1856 and moved into the park and restored in 1964. This simple, one-story, wood clapboard building reflects the strong Quaker presence in eastern Iowa and the beliefs and ideas that helped to shape President Hoover's life from childhood.

Tiles were added to the west, south, and east sides of the building in 1993 or 1994. These passively conduct water flows to an outfall in the creek bank and have a valve preventing backflow when the creek is high. An external mastic-type sealant was added to the basement walls at the same time. There is a sump within the basement to capture flows that enter the structure and pump them to daylight, and possibly into the outflow of the creek.

Blacksmith Shop was built with recycled barn wood in the historic core in 1957 to represent the Jesse Hoover Blacksmith Shop of the 1874-1879 period. Flood-protection and prevention measures have not been put in place (Wiesner pers. comm. 2005b).

Schoolhouse is a single-story, wood-frame structure built in 1853, moved to the park in 1968, and restored in 1977. A complete footing/perimeter tile system was installed and drains to the

storm water lift station and a sump. No sealant applications have been identified for the lower parts of this building.

Isis Statue. The bronze statue of the Egyptian goddess was placed in a designed landscape setting not far from Hoover Creek in the late 1930s and has a relatively tall poured-concrete base that raises the statue enough to afford protection.

Downey Street Bridge and Retaining Wall. The original Downey Street Bridge was of wood and was constructed across Hoover Creek in the late 1800s. In 1917, it was rebuilt in concrete, with stone abutments. In 1939, the banks of the creek were graded back and seeded, and a stone retaining wall was constructed west of the bridge. This wall is currently failing and overgrown with vegetation.

The park includes many other historic structures. However, they are situated in floodplains with a flood frequency of greater than 50 years and are unlikely to be affected, either adversely or beneficially, by actions associated with this plan and will not be discussed here.

All the residences on Poplar Street are connected to a storm water lift station located at Scellar's Barn. This connection was made to existing drainage, where available. There are not good records as to what existed around the houses, and it is unclear as to whether there is a connection from the Schoolhouse, but the line may connect to sumps with pumps and/or drain tiles.

Numerous reports describe and make recommendations for managing the park's historic structures and are listed in the bibliography.

Cultural Landscapes

The National Environmental Policy Act Section 1502.16, Environmental Consequences, identifies eight areas that should be considered in every environmental impact statement unless there is good justification for dismissing them from further consideration. They include "(g) Urban quality, historic and cultural resources, and the design of the built environment," which is included in cultural landscapes.

A cultural landscape refers to the entire fabric of a historic site that contributes to the appearance and ambience experienced in that area at an important or targeted time in history. For example, in addition to a building, contributing elements of a cultural landscape could include associated outbuildings, ornamental plantings from the target period, and period walkways, walls, and curbstones.

A cultural landscape by definition occupies a geographic area that incorporates natural and cultural elements that are associated with a historic activity, event, or person. Herbert Hoover National Historic Site incorporates three landscape categories:

- A historic designed landscape is consciously designed or laid out by a landscape architect, master gardener, architect, or horticulturist according to design principles. The landscape may be associated with a significant person, a trend, or an event in landscape architecture. Aesthetic values play a significant role.
- A historic vernacular landscape evolves through use by the people whose activities or occupancy shaped that landscape. The landscape reflects the physical, biological, and cultural character of those everyday lives. Function plays a significant role in

vernacular landscapes. They can be a single property such as a farm or a collection of properties such as an urban historic district.

- A historic site is a landscape that is significant for its association with a historic event, activity, or person.

As a historic designed landscape, the setting, location, landscaping, features, historic structures, and objects related to the Gravesite, Isis Statue, Library-Museum, and viewshed between the Gravesite and Birthplace Cottage illustrate the ways in which the landscape design of the area has been carefully shaped over the years. These landscape designs reflect the vision, planning, and desires of President and Mrs. Hoover, their family and friends, landscape designers, and the NPS.

The composite, historic, vernacular landscape was created by incremental changes over a period of more than 125 years. This landscape includes a re-created village representative of eastern Iowa in the 1880s. Actions over time have removed many historic landscape elements and have diminished some of the site's integrity for the early part of this period (Hoover's boyhood from 1874-1885).

As a historic site, the park draws significance from its association with President Herbert Hoover's life. Cultural landscape aspects are illustrated by the Birthplace Cottage, Friends Meetinghouse, Gravesite, and the city of West Branch of which the park is an integral part.

Details of the character-defining features of the cultural landscape are described below.

Spatial Organization

The Cultural Landscape Report (NPS 1995b) and the 2005 *Cultural Landscapes Inventory* (NPS 2005b) identifies six distinct landscape management areas with different landscape organizational patterns:

- Historic Core;
- Gravesite;
- Presidential Library-Museum;
- Loop Drive;
- Rural/Agricultural Setting; and
- Visitor Center and Park Support.

Historic Core represents the layered historic vernacular landscape of West Branch, Iowa, during the late 1800s. Its organization relates to the neighborhood streetscape grid pattern of roads, streets and right-of-ways, as well as the clustering of buildings and structures. During the latter part of the 19th century, modest, wood-frame homes with their outbuildings, wells, outhouses, and fenced yards were built in an orderly arrangement on relatively level areas along the village streets. Many of the original historic buildings were removed during the first half of the 20th century and later replaced with other structures from the target period brought in from elsewhere in the city to help re-create a sense of historic ambiance.

While many of the historic structures are not in their original location, their style, materials, location, massing, and color all evoke a strong sense of the historic scene during President Hoover's childhood. Character-defining features include the Birthplace Cottage, historic

street alignments, neighborhood houses, Blacksmith Shop, Friends Meetinghouse, vista to the Gravesite, rural views towards the Isaac Miles Farm, deciduous trees in the yards and along streets, and the view to the north of the downtown brick commercial blocks.

Gravesite. The presidential burial site contrasts with the grid pattern of the historic core. The Gravesite features a designed, gently-sloping, crescent-shaped memorial area containing the graves, flagpole, granite walkways, and formal plantings in a mowed lawn setting. In contrast to the simplicity and humble nature of the Birthplace Cottage, the design of this more formal landscape reflects a sense of dignity, respect, and solemnity appropriate for the graves of a President of the United States and his wife. Character-defining features include the hillside location and its simplicity of design, graves, semi-circular earthen form and landscaping, walks, benches, flagpole, and vista to the Birthplace Cottage.

Presidential Library-Museum. The more modern design, massing, and large footprint of the irregularly-shaped Library-Museum differ markedly from the clustering of small-scale buildings in other parts of the park. Character-defining features include the entry unit, buildings, lawns, and tree canopy.

Loop Drive. This park-like landscape includes clustered deciduous canopy trees, evergreens, shrubs, large expanses of lawn, and open space bisected from west to east by Hoover Creek. The curvilinear Loop Drive, situated south of Hoover Creek, reflects its beginnings as a race track, but today links parking for the picnic area and restrooms (north of the creek) and the Gravesite (south of the creek). Character-defining features include the drive/race track alignment, Hoover Creek, pedestrian bridge, the Boy Scout Shelter and Negus Family Association Shelter, the open vista between the Birthplace Cottage and Gravesite, and the open lawn with shade trees.

Rural/Agricultural Setting. This large L-shaped area consists of relatively flat riparian areas bordering Hoover Creek, and previously cultivated sloping upland areas to the south that are reconstructed native tallgrass prairie. The character-defining elements include the farm clusters and their component buildings and support facilities. Winding through the prairie is a trail consisting of mown grasses with interpretive signs and views back to the core area.

Visitor Center and Park Support. This area contains modern facilities, Visitor Center, West Branch's post office, NPS maintenance buildings, parking, signs, walks, site furnishings, and landscaped picnic facilities with open spaces. These areas are used for visitor services and maintenance and are within the street grid system of the city of West Branch. Character-defining elements include the 1928 boulder monument from the Iowa City chapter of the Pilgrim Daughters of the American Revolution.

Land Use Patterns

The park is a commemorative and memorial site and is maintained as open space, including mowed lawn with clustered plantings on either side of Hoover Creek. The vista between the Birthplace Cottage and Gravesite is maintained as open space to retain the visual and ideological connection between these two areas. Historic buildings in the historic core serve as residences or NPS offices. Visitor support areas, including the Visitor Center, picnic area, and maintenance facility, are clustered in the north and northeast parts of the park and generally include modern developments. Agricultural uses of the western and southern portions of the park have been retained.

Topography

The park is centrally bisected from west to east by Hoover Creek. The creek has created a relatively narrow, level floodplain, with gently sloping terraces that rise to higher land on either side. Drainage swales typical of the Southern Iowa Drift Plain formation act as overland and subsurface conduits for runoff from the upland. A tile drainage system installed to follow the topography and contributes to stream discharge still exists in the prairie and working farm fields.

Vegetation

Three general vegetation types have been identified within the park. Plant lists are included in the 1995 cultural landscape report (NPS 1995a), and prairie vegetation has been described in the prairie management plan (NPS 2003b).

Generally, the northeastern quarter of the park is planted in carefully manicured turf dotted with clusters of evenly spaced canopy trees, scattered groupings of seasonal flowers, and a few shrubs. Evergreen plantings screen the northern edge of the park in the picnic area.

The tallgrass prairie is located along the southern side of the site. For a century, this area was in crop cultivation, but in 1971 76 acres were replanted to native grasses and flowers and is actively managed. The tallgrass prairie area is gradually losing the rectilinear configuration of farm fields as new parcels are added, bringing the total area to 81 acres.

Circulation Patterns

The park's circulation systems include concrete and asphalt drives; gravel traces; asphalt, concrete, brick, and wood walkways; limestone and granite stepping stones; and pedestrian routes that are mowed or surfaced with gravel. Some of this system reflects the historic development of the city's street grid, but numerous subsequent additions were made by the NPS to provide access for visitors and staff. Parking areas were added during the latter part of the 20th century.

Downey Street, the former south entrance to the city of West Branch, was rerouted and replaced by Parkside Drive in 1970. Some of the other circulation routes that were rerouted or modified during development of park facilities and the Library-Museum include Water, Penn, Poplar, Cedar, First, Second, and Wetherell streets.

Pedestrian and vehicular bridges include the:

- modern wood–planked structural steel pedestrian bridge from the Loop Road parking to the picnic area;
- historic concrete-paved Downey Street Bridge with boardwalks for pedestrians southeast of the Birthplace Cottage;
- unnamed concrete bridge (modern) along the pedestrian/bicycle trail that crosses the Hoover Creek in the northwest section of the park; and
- modern Parkside Drive Bridge.

A historic retaining wall is located near the Downey Street Bridge. This was installed in 1939-1940 to help protect cultural resources from damage during flooding.

Water Features

Hoover Creek bisects the park from west to east, physically and visually linking the various landscape character and vegetative areas. The creek is one of the most enduring and visible elements of this cultural landscape.

NPS Collections

Museum collections include priceless and irreplaceable objects, specimens, photographs, and archival and manuscript materials that represent a broad spectrum of cultural and natural resources related to the park's mission. These collections help staff to manage resources and aid in interpretation and research. Collections are key resources for educators, students, park managers, researchers, park neighbors, and the general public.

The park's collection, with an estimated 7000 items, include furnishings for the Schoolhouse and Friends Meetinghouse, tools for blacksmithing and woodworking, agricultural implements, books, and works of art. About 700 of these objects are on display in four furnished structures where they help visitors visualize Hoover's boyhood surroundings. The collections also include photographs and archeological materials.

The Presidential Library-Museum also contains extensive archival collections, including President Hoover's papers, oral histories, photographs, and scholarly articles. The Library-Museum has developed its own plans for protecting these resources from flooding or other natural disasters.

WATER RESOURCES

Introduction

Water resources include the hydrology of Hoover Creek and its corresponding impacts on the floodplain, stream function, and water quality. Stream management actions under the no action or action alternatives is not anticipated to have any effect on groundwater resources except with respect to stream or floodplain functions; therefore, groundwater is not analyzed as its own topic and any potential effects to groundwater recharge as a stream or floodplain function are included in the respective subtopic.

Stream Function

Hoover Creek is a perennial stream that currently experiences an average annual flow rate of 2 to 3 cfs (USGS 2005). Stream flow rates tend to increase in the spring and early summer when snow melt and precipitation increases (USGS 2005). The current average stream channel capacity is approximately 315 cfs. In general, a flood occurs whenever the flow exceeds this rate. Currently, the stream's average channel capacity is exceeded at flow rates equivalent to a 2-year event. The existing channel capacity within the park can be as small as 100 cfs (NPS 2004b). Downstream portions of the stream experience slower flow rates due to backwater from the west branch of Wapsinonoc Creek; however, the higher volume of water exceeds the holding capacity of the stream and floods surrounding areas.

Hoover Creek drains approximately 1,700 acres of agricultural fields, residential land, and a golf course. Historically, what is now Hoover Creek was a linear slough/wetland fed by groundwater and surface runoff. The stream is now subject to increased surface water runoff rates and volumes, resulting in slumping stream banks, continual erosion, down-cutting of the stream bed, and poor water quality from high sediment loading.

In preparation of this plan, hydrologists evaluated the condition of Hoover Creek and performed a geomorphic assessment using Rosgen's stream classification method (Rosgen 1996). In general, hydrologists reported that several indicators of an unstable system were noticeable, including vertical banks, mass wasting of bank material and slumps in the bed, overhanging vegetation at the tops of the banks, knickpoints (head cuts), and incised, vertical toes at the inside banks of meanders. Rosgen's stream classification method was applied so that:

- stream behavior can be predicted from its appearance;
- hydraulic and sediment relationships can be developed;
- site-specific data can be extrapolated to stream reaches having similar characteristics; and
- there is a consistent frame of reference for communicating stream morphology and condition among a variety of disciplines and interested parties.

Rosgen's method includes all possible stream types, which vary according to a combination of sensitivity to disturbance, recovery potential, sediment supply, stream bank erosion potential, and vegetation controlling influence. A partial listing of Rosgen's stream condition classifications can be found in Appendix E.

Hoover Creek was classified using Rosgen's method and the Village Green and Historic Core Stream Management Units were determined to be G6 segments. The Recreation and Prairie Stream Management Units were classified as F6 segments (bolded in Appendix E).

Streams in both of these classifications have a highly entrenched main channel with a low width-to-depth ratio and moderate sinuosity (natural meandering of a stream). Based on the amount of overlap of entrenchment and sinuosity ratios between F6 and G6 reaches, an F6 reach could fall within the G6 classification and vice-versa. Hoover Creek would be most representative of a G6 classification, which is considered to have high bank erosion potential and poor self-recovery potential (NPS 2004b).

Prairie and Recreation Stream Management Units

The Prairie and Recreation Stream Management Units are generally in a degraded condition, with the banks incised and evidence of active bank slumping and erosion. The stream bed and channel bottom are approximately 9 feet below the top of the stream bank.

The stream has a very high sensitivity to disturbance, poor recovery potential, high sediment supply from the channel or adjacent slopes, and high erosion potential. The stream would be highly influenced by vegetation, meaning that there is a high correlation between changes in the composition, vigor, and density of vegetation and changes in the morphology and stability of the stream.

Historic Core Stream Management Unit

The stream has a very high sensitivity to disturbance, fair recovery potential, high sediment supply, and very high potential for stream bank erosion. The stream is moderately influenced by the presence of vegetation.

Village Green Stream Management Unit

This unit has the most common flood occurrence, which largely results from backwater from flooding of the west branch of Wapsinonoc Creek and does not relate specifically to poor stream function. The Hoover Creek channel east of Parkside Drive is deeply incised with depths to the channel floor ranging from 7 to 9 feet, and a bank-to-bank width of less than 30 feet. Dense vegetation stretches along the channel in this portion of the reach. West of Parkside Drive, stream entrenchment has somewhat stabilized and appears to function more properly than the rest of stream corridor.

In general, the stream condition classification east of Parkside Drive shows that there is a very high sensitivity to disturbance, fair recovery potential, high sediment supply, and very high potential for stream bank erosion. The stream is moderately influenced by the presence of vegetation.

Stream Function Summary

Overall, Hoover Creek does not function as a healthy stream and is not self-sustaining. This is evidenced by its continual entrenching and erosive processes, which have created a deeply incised trench, slumping of banks, and overhanging vegetation along much of the stream. The condition of the stream reveals that the problem is self-exacerbating because much of the stream has a very high sensitivity to disturbance, high potential for erosion and sediment supply, and poor recovery potential. This means that the stream is more likely to respond adversely to increased runoff rates and volumes with less possibility for self-recovery.

Floodplains

Floodplains are lowland and relatively flat areas adjacent to streams that are periodically subject to flooding. Floodplains are an important and inseparable part of the perennial channel. When bankfull flow is exceeded, water spreads out onto flat adjacent lands which are necessary in maintaining natural floodplain values (BLM 2003).

Natural floodplain values are defined in NPS DO 77-2 as “attributes of floodplains which contribute to ecosystem quality, including, but not limited to, soils, vegetation, wildlife habitat, dissipation of flood energy, sedimentation processes, and groundwater (including riparian groundwater) recharge. Periodic disturbance of natural floodplain soils and geomorphic and vegetation attributes by floods also contributes to ecosystem quality” (NPS 2004g). In general, Hoover Creek’s floodplain does not possess all of these natural floodplain values, because much of the floodplain occurs on the terrace in a suburban park setting with manicured landscaping. The quality of the riparian ecosystem it supports is a function of the larger ecosystem the floodplain is contained within. The floodplain predominantly serves functions of dissipating flood energy, sediment retention/discharge, groundwater recharge, and water quality improvements, to the extent possible, depending mostly on the vegetation and soil types.

Hoover Creek's floodplain differs along the stream corridor, according to its stream management unit. The Prairie Stream Management Unit has a more active floodplain than the rest of the corridor, with the inner floodplain being inundated with every major storm event and floodwaters inundate the terrace almost annually at some point along this reach. There is a natural levy that has developed from soil deposition on the south side of the stream.

A flood event defines the probability that a certain amount of water is possible in any one year. For example, a 100-year floodplain describes the lands adjacent to the stream that have a one percent (one in 100) chance of flooding in any given year. A five-year flood would have a 20 percent chance of occurring in any given year. The Floodplain Boundaries map (Figure 2) shows the extent along Hoover Creek of the 5-, 10-, 25-, 50- and 100-year floods and which features are most at risk for flood damage.

A list of floodplain frequencies or recurrence intervals for park features of concern is included in Table 11. These frequencies are based on the elevation at which water would contact the structure to take into account probable damage to historic fabric below the first floor level.

TABLE 11. FLOOD RECURRENCE INTERVALS FOR SEVERAL PARK FEATURES

Feature (upstream to downstream)	Flood Recurrence Intervals
Picnic shelters/comfort station	25 years
Library-Museum	5 years
Scellar's Barn	Less than 5 years
Schoolhouse	43 years
Blacksmith Shop	27 years
Birthplace Cottage	17 years
Isis Statue	15 years
Friends Meetinghouse	Less than 5 years
Visitor Center	7 years
Maintenance Buildings	Less than 5 years

Note: Recurrence interval is defined as the average time interval between occurrences of a flood of a given or greater magnitude (NPS 2004).

Increasing development in the Hoover Creek watershed upstream from the park has contributed increased storm water flows into the stream and has affected the natural floodplain and floodplain values. This has produced an increase in the stream's peak flow compared to native conditions. This exacerbates the degradation of the channel and limits the ability of the stream to dissipate flood energy. Flooding is most dependent on the amount and timing of precipitation. Annual precipitation in the area averages 33 inches with dry conditions occurring in winter and late summer, and about 60 percent of the precipitation occurs during the growing season (which extends over 183 days from April through September) (NPS 2004a).

As shown in Figure 2, more than half of the park lies within the 100-year regulatory floodplain, and frequent over-the-bank-flooding events occur. These events cause accelerated erosion and sloughing of banks that result in meandering in the vicinity of Library-Museum and Historic Core Stream Management Unit. The incidence of flooding in the area is

increased by the lack of an adequate city storm sewer system to drain even moderately heavy rainfall events.

Water Quality

Hoover Creek's water quality is affected by upstream land uses, including active development for new residential and business units, agricultural activities, a golf course, and residential housing. Best management practices in the watershed have moderated some of the impacts of agriculture on the stream. For example, approximately 75 percent of the farms in the West Branch area currently employ no till methods. Despite these efforts, the park continues to be affected by water quality issues. Suspension of silt from erosion, high levels of fecal coliform, and nitrate loads have been noted as significant water quality concerns.

In 1999, the NPS consolidated surface water quality data from the U.S. EPA's Storage and Retrieval (STORET) water quality database management system and River Reach File (RF3) database. The results of the STORET retrieval indicated that 80 observations for 26 parameters were reported by the NPS at four monitoring stations from 1989 through 1998. Of the four monitoring stations, two stations were located within the park. The results of the park water quality screening found two groups of parameters that exceeded screening criteria at least once within the study area. Nitrite plus nitrate exceeded the EPA drinking water criterion, and fecal coliform exceeded the NPS Water Resources Division screening limit for freshwater bathing. It is for these reasons park staff discourage visitors from having contact with Hoover Creek (NPS 1999).

All surface waters in Iowa are classified for protection of general uses (i.e., watering, non-contact recreation, aquatic life, crop irrigation, etc.). In addition, the state may further classify a water body with a designated use or a standard for which the water quality must be protected. Common designated uses include body-contact recreation, aquatic life support, public water supplies, and industrial and agricultural purposes (NPS 2004f). Hoover Creek is not classified by the state of Iowa for designated use (IDNR 2005). The west branch of Wapsinonoc Creek, whose confluence with Hoover Creek is located just east of the park boundary, is classified with a designated use of B (LR), or limited resource warmwater, which affords the west branch of Wapsinonoc Creek protection for wildlife, fish, aquatic and semi-aquatic life, and secondary contact water uses.

VISITOR UNDERSTANDING AND APPRECIATION

Introduction

The purpose of the park includes providing an accessible, dignified, and spacious setting in which visitors can interpret the life, career, and accomplishments of Herbert Hoover. The park's significance is inherently tied to the commemoration of the places where the young life of Herbert Hoover took place and his ethics and character were formed. The park provides the opportunity to experience the Birthplace Cottage, Gravesite, Library-Museum, and various buildings that commemorate President Hoover.

In the park's general management plan, one of the park's desired future conditions is that the public be able to make connections between Herbert Hoover's boyhood and his adult

accomplishments through an innovative, accessible, enjoyable, and educational visitor experience on-site and/or through outreach programs (NPS 2004a).

Visitation

Herbert Hoover National Historic Site received 183,364 visitors in 2003 (NPS Public Use Statistics Office 2004c). The park is used as a local park and as a destination for others; most visitors to the park are day use visitors from other regions (55 percent) and 20 percent are local day use visitors (NPS Public Use Statistics Office 2004d). Visitation is largely self-guided. While the majority of visitors (67 percent) come to view the various sites and exhibits to learn about the life of Herbert Hoover, many local residents use the area for jogging, picnicking and outdoor recreation.

Visitors to the park have many options for exploring and learning about the life of Herbert Hoover. Most visitors begin their tour at the Library-Museum, one of only eleven in the nation. Interpretation is based on the commemoration of Herbert Hoover through programs that provide opportunities to discover the significance of his life's accomplishments.

Visitor Experience

The visitor experience ranges from the contemplative, passive quality of the Gravesite, to the interactive interpretation offered at the Birthplace Cottage and Blacksmith Shop, where live demonstrations of the craft are sometimes held.

The restored tallgrass prairie contains 1.7 miles of walking trails and is intended to give visitors a sense of the landscape typical of Iowa in the time of President Hoover's childhood, which influenced his life-long love of the natural world.

- The creek and tallgrass prairie are considered symbols of nature's influence upon the development of Hoover's value system, which included a love of fishing and nature. Here the visitor can gain a sense of these influences. The Junior Ranger program includes curriculum on stream erosion, threats of erosion to historic structures, and plants and animals in the riparian corridor (Peterson pers. comm. 2005).

There are two wayside exhibits that explain the noticeable erosion which is occurring along the banks of the stream and the streamflow monitoring program. A brochure is available entitled "Streamflow Monitoring Station".

The general management plan's preferred alternative calls for an interpretive message regarding Hoover Creek to contrast its current condition to its presumed condition during Hoover's childhood (NPS 2004a).

PUBLIC HEALTH AND SAFETY

Introduction

The park is open all but three days of the year and staff are present to respond to the safety needs of staff and visitors. The NPS has concurrent law enforcement jurisdiction within the park. Park staff is responsible for directing visitors and staff to safe locations and exits during times of emergency, such as flooding, fire, or storms.

Public Health and Safety of Hoover Creek

Park staff discourages visitors from accessing the creek due to its poor water quality, slumping stream banks, and occasional high flows. The creek is sometimes integrated into educational programs for local schools; however, only park resource staff access the creek while demonstrating water sampling methods.

Hoover Creek's undercutting and slumping of the stream banks creates a fall hazard to park staff and visitors who venture too near the edge of the creek's embankment, as the edges may not be stable and six- to eight-foot drop-offs are present.

Due to the location of many park facilities within Hoover Creek's floodplain and the high frequency of flooding events that occur, visitors and NPS staff are subject to health and safety risks associated with human contact with floodwater and deposited sediment that can be contaminated with chemical and biological wastes incorporated in the floodwater.

PARK OPERATIONS

Introduction

The superintendent is responsible for managing the park, its staff, all of its programs, and its interactions with persons, agencies, and organizations interested in the park. Park staff provides the full scope of functions and activities to accomplish management objectives and meet requirements of law enforcement, emergency services, public health and safety, science, resource protection and management, emergency services, interpretation and education, utilities, and management support.

Preparation for and Mitigation of Flood Events

Park personnel implement administrative, interpretive, personnel, emergency, and maintenance plans as part of their prescribed duties. There is a stream level alarm, which is somewhat old and not heavily relied upon, located at the Downey Street Bridge. When flooding is imminent, the alarm is intended to alert park management. Park maintenance employees are tasked to move vehicles, tractors, and other maintenance equipment from the maintenance building to the Miles Farm or other high ground and raise records and supplies off the maintenance shop floor. Other measures include sand bagging as necessary, closing of the comfort station, closing park and Visitor Center public access and trails if flooded, and monitoring individual building alarms for sump-pump failure.

Post-flood activities include actions to return the park to normal operating conditions, such as cleaning and restoring damaged historic properties or objects, debris removal and landscape clean-up, and stream channel repairs and replanting. Following the flood of 1993, the park waterproofed basements and foundations and installed passive drains and sump pumps in structures that were affected.

Landscape Maintenance

The formal and complex landscape of the park receives skilled routine maintenance and regularly scheduled mowing, weeding, and the transplanting and planting of trees, shrubs, and flowers. Until 2003, mowing was performed to the edge of the creek bank and where

accessible, over the bank. Currently, a 10- to 15-foot buffer remains along most of the creek. The exceptions are in the prairie where the stream has eroded up to and into the mowed path and the portion of the creek that transects the Birthplace-Gravesite vista. These areas are mowed up to the edge of the creek. Stream channel maintenance includes removal of vegetation and debris.

SOILS

Introduction

Soils are related to the underlying geology, landforms, relief, climate, and natural vegetation of a given area. The park is located on the Southern Iowa Drift Plain (IGS 2003, NPS 2003a, NPS 2003, and NPS 2003b). Elevation ranges from about 710 to 790 feet above sea level. Topography is flat in the riparian (stream) area to gently rolling in the upland or prairie areas. Subsequent water erosion has developed slopes that vary from 1 to 12 percent with north and northeast aspects. Erosion can occur on slopes along the west side of the prairie and also in a draw south of the Gravesite parking area.

There are no bedrock exposures in the area, including the stream bed. The Southern Iowa Drift Plain is characterized by very deep soils overlying bedrock. There are five distinct silty-clay-loam soils in the area: Tama silty-clay-loam, Colo-Ely-Judson complex, Colo silty-clay loam, Downs silt loam, and the Adair clay loam (USDA 1979 and NPS 2003a). These soils have moderate to moderately slow permeability and are susceptible to sheet erosion. Generally, Tama-Downs soils occur on uplands with Colo-Ely alluvium complex in drainages. The majority of these soils developed in loess (windblown silt). Native prairie dominated these silt loams to develop rich topsoil. Loess "caps" the underlying glacial till, which is heavier in texture. Side hill seeps can occur where loess and glacial till meet at lower levels of hillsides.

Soil Types in Stream Management Units

Soils encountered in all of the stream management units are identified as belonging to the Colo-Ely complex. The Colo-Ely complex consists of gently sloping soils along small streams and narrow upland drainage ways.

The loess cap of Colo-Ely complex along the stream corridor is overlaid by approximately 24 inches of native topsoil. The native prairie that existed prior to settlement created this topsoil (NPS 2003a). Another topsoil layer of approximately 24 inches lies above the native layer and is a silt complex with little organic material. Floodwater from the creek carries this soil from the upper watershed and deposits it on the terrace. This deposition process has created a natural levy, which can be seen on the south side of the stream.

In the Prairie Stream Management Unit, floodwaters have deposited sands, gravels, silts, and mud on the inner floodplain. Lateral movement of the stream creates point bar deposits of sand and gravel.

In the Recreation Stream Management Unit, floodwater that inundates the grassy terrace frequently deposits sands, silts and mud. Point bars are active in this reach and also consist of sands and gravels. Agricultural tile opens into the stream, and culverts and waterways carry

surface runoff from the interior of the loop road and hard surfaces associated with parking facilities directly to the stream. Storm water outfalls hang over the stream where erosion has removed soil from beneath the pipe, since original placement. Drainage ways have caused eroded gullies, primarily because mowed cool season lawn is incapable of holding soils against the erosive force of the water.

In the Historic Core Stream Management Unit, flooding leaves behind sand, silt and mud on the stream bank and terrace.

In some of the Village Green Stream Management Unit, the banks and point bars west of Parkside Drive appear stable and are well vegetated. The adjacent river terrace is within the 5-year flood recurrence area and is thus subject to frequent flooding and deposition of flood deposits of sand, silt and mud.

VEGETATION

Introduction

Three general vegetation types have been identified and include the manicured lawn, shrubs, and trees surrounding the primary visitor facilities, the tallgrass prairie, and agricultural fields. The agricultural fields in the far western portion of the park are outside the immediate project area and are therefore not described.

The first vegetation type consists of approximately 50 acres of maintained lawn, primarily Kentucky bluegrass and fescue, with a scattered overstory of deciduous trees, evergreens, flowering trees, and shrubs (NPS 2004a, NPS 2003a, and NPS 2003b). This vegetation is located around historic buildings, visitor services, picnic areas, offices, and Library-Museum.

The second vegetation cover is the 81 acre tallgrass prairie (NPS 2003a). The reconstructed prairie consists of a blend of 50 percent grasses and 45 percent forbs. The most abundant grass is big bluestem at about 35 percent relative cover, with Indian grass, switchgrass, little bluestem, side-oats grama, and Canada wildrye also present. Prairie forbs include a high percentage of tall goldenrod at about 30 percent cover, with prairie sunflower, hairy aster, saw-tooth sunflower, prairie ragwort, and wild bergamot well represented (NPS 2003b). The prairie includes about 5 acres of low wet meadow, with the remaining area a mosaic of mesic and upland habitat, transected by drainage swales. Prescribed fire and brush cutting has been used to maintain prairie species.

A narrow corridor of vegetation in the riparian area along the stream contains disturbance-adapted species associated with deeply-eroded, channeled flood areas. Areas of this corridor have been hardened at key points by planting native deep-rooted plants to impede erosion. Trees have been removed from the creek banks to eliminate the potential of being swept downstream and obstructing flow during high water events, but many remain and young trees have grown up within the banks. Weeding, pruning, and other management of creek bank vegetation add to the manicured appearance of the adjacent lawn.

Vegetation in the Stream Management Units

The four stream management units each have their own distinctive vegetation types.

The Prairie Stream Management Unit is dominated by tallgrass prairie and cool season grasses on the banks and the terrace. A sparse tree cover of deciduous trees occurs on the upper terrace north of the stream and in the western edge of this reach. Wet to mesic native prairie vegetation grows south of the stream. Two invasive species, reed canary grass and smooth brome, are present at the confluence of the two tributaries. Point bars are revegetating along this reach, largely due to establishment of reed canary grass or smooth brome.

The Recreation Stream Management Unit is a canopy of deciduous trees sparsely covering the stream terrace, and mowed lawn (Kentucky bluegrass) dominates as ground cover up to the fall of the bank. Reed canary grass and a collection of invasive and exotic species cover the interior stream banks. Native shrubs and herbaceous plants hold positions in some areas, but aggressive species are well-established.

The Historic Core Stream Management Unit is a canopy of evergreen and deciduous trees occurring sparsely on the terrace of the stream and mowed lawn (Kentucky bluegrass) dominates as ground cover up to the fall of the bank. A "not-to-be-mowed" strip follows the stream corridor, but no true riparian vegetation exists. Vegetation height is kept low through the Birthplace-Gravesite vista. Vegetation within the corridor consists of reed canary grass and smooth brome, a few native forbs, and both non-native and native woody plants. The woody plants extend above the terrace height and present a contrast to the surrounding formal landscape.

The Village Green Stream Management Unit has banks and point bars that appear stable and well vegetated. Most of the vegetation in the riparian area is herbaceous. Black walnuts, white mulberry, and willows are seen throughout the reach. Several shade trees grow at the edge of the bank and other desirable trees line the terrace about 20 to 30 feet from the stream. The stream terrace is mowed, but mowing stops at least six feet from the bank edge. Vegetation in the stream corridor consists of a mix of native and non-native plant species, including ornamental trees. For a list of representative plant species likely to occur in the project area, see Appendix C.

WILDLIFE

Introduction

The park provides a patch of habitat, surrounded by a small town and agricultural lands. This setting can be referred to as "postage stamp" habitat, and it is very important in supporting many species common in eastern Iowa. Past inventories have revealed only one amphibian and few fish, but reptiles, mammals, and birds abound (NPS 2004g). Some of the smallest animals that depend on the prairie include butterflies, moths, bees, and other uniquely adapted insects.

Seventeen species of mammals, four species of reptiles, and 59 species of birds have been confirmed and nine species of butterflies and 43 species of insects and spiders have been observed (NPS 2004g). Native animals typical for this region are found within the prairie.

Wildlife in the Stream Corridor and Riparian Area

The wet meadow and creek provide habitat for several species of snakes: fox, Dekay's brown, and garter. Additionally, ribbon, rat, and bull snakes have been observed in mesic areas of the prairie. The known amphibian is the American toad, but chorus frogs have been heard in the northwest area of the park and may occur on private land (NPS 2003a).

Mammals found along the stream corridor include opossum, red fox, and several members of the mouse family. Also encountered are the plains pocket gopher, Eastern cottontail rabbit, striped skunk, squirrels, raccoon, Eastern mole, and woodchucks that burrow into the stream bank (NPS 2004g).

Many birds associated with the prairie, suburban woodlots, and developed areas are found in the riparian unit. Grassland obligates, which are of special interest to the park, include sedge wren, dickcissel, grasshopper sparrow, Henslow's sparrow, bobolink, and Eastern and Western meadowlark (Stravers *et al* 2004). Henslow's sparrow, an Iowa threatened species, has been observed in the park (Stravers *et al.* 2004). The park actively manages the grasslands and meadows with prescribed fire and invasive plant control to enhance the habitat available for these avian species.

No terrestrial invertebrate studies have been done to date (NPS 2003b). The configuration of the prairie with trees growing along the north side and numerous late flowering forbs seem to provide excellent nectaring and roosting opportunities for migrants. Monarchs, sulfers, skippers, blues, swallowtails, and brushfooted butterflies have been sited (NPS 2003b).

Fishes may occur in the stream when base flows are stable. Several minnows have been observed, including creek chub and an unidentified dace. Park staff has provided anecdotal evidence of occasional sucker activity in the stream (NPS 2003a). The park has not conducted an inventory of macro-invertebrates or fishes associated with the stream. For a list of representative wildlife species likely to occur in the project area, see Appendix C.

State-Listed Species

The restored prairie may provide habitat for one state listed species – the Henslow's sparrow. This bird is listed as a threatened species by the state of Iowa, Department of Natural Resources (IDNR 2002).

The Henslow's sparrow is a small, brown bird with conical bill and a short tail. It can be distinguished from other sparrows by its olive face and rusty wings. They are short-distance migrants and breed in grassland habitats (Gough 2004). Their native range includes the prairies of eastern Iowa and neighboring states. They prefer grasslands that are subject to periodic fire or mowing to prevent invasions by woody species. Its abundance has been declining as stretches of open prairie diminish. Active grassland management is necessary to maintain suitable habitat for Henslow's sparrow, as well as other grassland bird species (Melde and Koford 1996).

ENVIRONMENTAL CONSEQUENCES

GENERAL ANALYSIS METHOD

For each impact topic, applicable regulations were identified and the techniques used to perform the analysis were defined. Each impact topic analysis then involved the following steps.

Define issues of concern, based on internal and public scoping.

Identify the geographic area that could be affected.

Define the general assumptions used in the analysis.

Define the resource within that area that could be affected. This information was included in "Affected Environment" (Chapter 3).

Compare the resources to the area of potential effect.

Identify the effects caused by the alternative, in comparison to the baseline represented by the no action/continue current management alternative, to determine the relative change in resource conditions. Both direct and indirect effects are considered. An effect can be a direct result of an action or can occur indirectly because of a change to another resource or impact topic. An example of an indirect impact would be increased mortality of an aquatic species that would occur because an alternative would increase soil erosion, which would reduce water quality.

Characterize the effects based on the following factors:

- Whether the effect would be beneficial or adverse.
- Context or area affected by the alternative: site-specific, local, park-wide, regional.
- Duration of the effect, either short-term or long-term. Unless and impact-topic-specific definition of these terms is provided, the following were used.
- Intensity of the effect, either negligible, minor, moderate, or major. Impact-topic-specific thresholds for each of these classifications are provided in each impact topic methodology section. Threshold values were developed based on federal and state standards, consultation with regulators from applicable agencies, and discussions with subject matter experts.

Determine whether impairment would occur to resources and values that are considered necessary and appropriate to fulfill the purposes of the park.

Determine cumulative effects by evaluating the effect in conjunction with the past, present, or foreseeable future actions.

If appropriate, *identify mitigation measures* that may be employed to offset potential adverse impacts.

GENERAL ASSUMPTIONS

- A contractor would be hired to complete construction required under any of the action alternatives. Park staff would monitor their progress and activities, and share responsibility for compliance with required mitigation measures, but would not be responsible for any construction.
- Construction for the action alternatives would commence in the late summer, when precipitation rates are historically low, and continue for a period not to exceed six months.
- The park would remain open to visitation throughout the construction period.

CUMULATIVE EFFECTS ANALYSIS METHOD

The Council on Environmental Quality (1978) regulations for implementing the National Environmental Policy Act require an assessment of cumulative effects in the decision-making process for federal actions. Cumulative effects are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative effects are considered for the no action and action alternatives.

Past, ongoing and future actions that have the potential to have a cumulative effect in conjunction with this plan include:

General Management Plan and Environmental Assessment. The *National Historic Site General Management Plan*, completed in 2004, maintains that the NPS will manage resources to provide a natural setting to support the commemorative emphasis of the site. It includes prescriptions for managing the stream, as well as protecting historic resources and enhancing visitor understanding and appreciation. The stream is a major landscape feature transecting the park and its appearance must be consistent with the management units through which it passes.

Construction of a City Water Main. The city of West Branch has proposed a water main to cross Interstate-80 from the south and travel along the fence line between the Thompson Farm (NPS property under life-estate) and the prairie. It will go west at West Main Street. The project will be completed several years prior to implementation of this SMP/EIS so short-term effects are not expected to contribute to cumulative effects. However, any potential long-term effects are considered in the cumulative effects analysis.

Fire Management Plan. The park prepared a fire management plan that directs the use of prescribed fire to maintain the prairie ecosystem. This plan could contribute to cumulative effects if a prescribed fire were implemented concurrent with stream management activities.

Prairie Management Plan. The park prepared a prairie management plan for the long-term management of its prairie. Activities under this plan include treatment of exotic plants, including the use of prescribed fire, herbicide, and planting of native species.

Tree Replacement Plan. In 2006, the park will develop a 10-year tree replacement plan to stay ahead of the natural attrition of trees. Some tree replacements will occur in areas affected by the stream management plan; therefore, designs need to be consistent with the stream management activities included in this plan.

Development of New Maintenance Facility. The general management plan's preferred alternative included the potential reuse of the Thompson Farm structures, where feasible, or development of a new maintenance facility on the Thompson Farm. This project would relocate the central maintenance facility out of an area most prone to flooding.

Development of a New Flood Emergency Plan. The park's flood emergency plan, written in the 1970s, has been incorporated into the park's Emergency Operations Plan.

IMPAIRMENT ANALYSIS METHOD

NPS *Management Policies 2001* (NPS 2000a) require analysis of potential effect to determine whether or not actions would impair recreation area resources or values.

The impairment that is prohibited by the Organic Act and the General Authorities Act is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. Impairment may result from NPS activities in managing Herbert Hoover National Historic Site, from visitor activities, or from activities undertaken by concessioners, contractors, and others operating in the park.

An impact on any park resource or value may constitute impairment. However, an impact would be most likely to constitute impairment if it affects a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Herbert Hoover National Historic Site;
- key to the natural or cultural integrity or to opportunities for enjoyment of the park; or
- identified as a goal in the general management plan or other relevant NPS planning documents.

A determination of impairment is included in the impact analysis section for all impact topics. It is based on the impact-topic-specific definition of impairment that is provided in the methodology section for each impact topic that addresses park resources or values.

CULTURAL RESOURCES

Guiding Regulations and Policies

Various Federal Laws, Regulations, Executive Orders, policies, and guidelines are applicable to the National Park Service's management of cultural resources. A full list of these regulations can be found in Appendix D.

Methodology and Assumptions

Geographic Area Evaluated for Impacts

Most of the direct and indirect impacts upon cultural resources would occur along Hoover Creek and its floodplain. However, the impact analysis also includes the adjacent cultural landscapes, including the Gravesite, because modifications to the creek and floodplain areas could have an indirect impact on these areas as well.

Impact Criteria and Methodology

Cultural resource issues related to existing stream management and potential management actions identified during internal and public scoping include:

- In its current configuration, stream flooding potentially threatens a number of the park's historic structures, furnishings, and artifacts.
- Continued erosion and impact from flooding could damage the Hoover Presidential Library-Museum, Birthplace Cottage, and their contents.
- Both flooding and stream management measures could damage or destroy the historic retaining wall at the Downey Street Bridge.
- Stream bed management actions need to be implemented within the context of the *Herbert Hoover National Historic Site Cultural Landscape Report* and retain the visual connection between the Birthplace Cottage and the Gravesite.
- The stabilization of the stream channel or modifications to adjacent areas could damage archeological resources along Hoover Creek.

Cultural resources are subject to provisions of the National Environmental Policy Act (NEPA) and the National Historic Preservation Act (NHPA) and their implementing regulations.

The §106 criteria for characterizing the severity or intensity of impacts are the determinations of effect: *no historic properties affected*, *adverse effect,* or *no adverse effect*.

- A determination of no historic properties affected means that either there are no historic properties present or there are historic properties present but the undertaking will have no effect upon them.
- A determination of no adverse effect means there is an effect, but the effect would not meet the criteria of an adverse effect, i.e. diminish the characteristics of the cultural resource that qualify it for inclusion in the National Register. A no adverse effect finding also may include beneficial effects of an action.
- An adverse effect occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for inclusion in the National Register, e.g. diminishing the integrity (or the extent to which a resource retains its historic appearance) of its location, design, setting, materials, workmanship, feeling, or association. Adverse effects also include reasonably foreseeable effects caused by the alternatives that would occur later in time, be farther removed in distance or be cumulative. Because cultural resources are nonrenewable, all adverse effects on National Register-eligible cultural resources would be long term and have a high level of concern.

Under NEPA, potential impacts are described in terms of: type (the effects are beneficial or adverse), context (the effects are site-specific, local, or even regional), duration (the effects are short-term ─ lasting less than one year, long-term ─ lasting more than one year, or permanent), and intensity (the effects are negligible, minor, moderate, or major). For cultural resources the duration of effects on virtually all cultural features other than vegetation components would be long-term effects because most cultural resources are non-renewable. These would include any effects on archeological, historic, or on non-vegetation elements of a cultural landscape.

Impacts also were evaluated to determine if they would impair the park's cultural resources. Because definitions of intensity (negligible, minor, moderate, or major) vary by impact topic, intensity definitions are provided separately for each impact topic analyzed.

Museum collections are generally ineligible for listing in the National Register and not subject to §106 of the NHPA. Therefore, potential impacts to museum collections are described using NEPA terminology. The definitions of impact intensity for museum collections are included in the following section.

CEQ regulations and NPS policy call for a discussion of the appropriateness of mitigation and analysis of how effectively mitigation would reduce intensity of a potential impact, e.g., reducing the intensity of an impact from major to moderate or minor. Any resultant reduction in intensity of impact through mitigation is an estimate of the effectiveness of mitigation under NEPA definitions. It does not suggest that the level of effect as defined by §106 is similarly reduced. Cultural resources are non-renewable resources and adverse effects generally consume, diminish, or destroy the original historic materials or form, resulting in a loss in the integrity of the resource that can never be recovered. Unlike NEPA, where mitigation may result in a no-effect determination, actions determined to have an adverse effect under §106 may be mitigated, but the effect remains adverse.

A §106 summary is included following the cultural resource impact analysis sections. The §106 summary is intended to meet the requirements of §106 and is an assessment of the effect of the undertaking (implementation of the alternative) on cultural resources, based upon the criteria of adverse effect found in the Advisory Council's regulations.

Impact Threshold Definitions

Impact threshold definitions have been drafted for and are included with each of the cultural resource topics (archeology, historic structures and districts, cultural landscapes, and museum collections) to help ensure that the intent and legal requirements of both NEPA and NHPA are met in this document.

Methodology for Archeological Resources

Many important questions about human history can only be answered by the physical material of archeological resources. An archeological site can be eligible to be listed in the National Register of Historic Places if the site has yielded, or may be likely to yield, information important in prehistory or history. An archeological site can be nominated to the National Register in one of three historic contexts or levels of significance: local, state, or national. Impact intensity thresholds are based on the potential of the site to yield important information, and the probable historic context of the affected site.

Impacts on archeological resources were evaluated using the process described in the beginning of this section. Definitions of intensity levels are as follows:

Negligible: Impacts of the action are at the lowest levels of detection – barely measurable with no perceptible consequences, either adverse or beneficial, to archeological resources. For purposes of §106, the determination of effect would be *no effect on historic properties*.

Minor adverse: The action would impact an archeological site(s) with modest data potential and no significant ties to a living community's cultural identity. The site disturbance is confined to a small area with little, if any, loss of important information potential. For purposes of §106, the determination of effect would be *no adverse effect*.

Minor beneficial: The action would result in preservation of a site in its natural state. For purposes of §106, the determination of effect would be *no adverse effect.*

Moderate adverse: The action would impact an archeological site(s) with high data potential but with no significant ties to a living community's cultural identity. Disturbance to the site would be modest, but would cause some a loss of integrity. The determination of effect for §106 would be *adverse effect*.

Moderate beneficial: The action would enable stabilization of the site. For purposes of §106, the determination of effect would be *no adverse effect*.

Major adverse: The action would impact an archeological site(s) with exceptional data potential and that has significant ties to a living community's cultural identity. Disturbance of the site may be substantial, resulting in the loss of most or all of the site and its potential to yield import information. The determination of effect for §106 would be *adverse effect*.

Major beneficial: Active intervention occurs to stabilize the site and develop future preservation measures that would foster conditions under which archeological resources and modern society can exist in productive harmony and fulfill the social, economic, and other requirements of present and future generations. For purposes of §106, the determination of effect would be *no adverse effect*.

Impairment

A major, adverse impact occurs to an archeological resource whose conservation is necessary to fulfill specific purposes identified in the establishing legislation as key to the natural or cultural integrity of the park; or identified as a goal in the park's general management plan or other relevant NPS planning documents.

Methodology for Historic Structures, Buildings, and Districts

To be listed in the National Register of Historic Places, a structure or building must meet the following criteria:

- Be associated with an important historic context. That is, it must possess significance such that a meaning or value is ascribed to the structure or building.
- Have integrity of those features necessary to convey its significance. Typically, these would include location, design, setting, workmanship, materials, feeling, and national association.

Impacts on historic structures, buildings, and districts were evaluated using the process described in the beginning of this section. Definitions of intensity levels are as follows:

Negligible: The action would not have the potential to cause effects on historic structures, buildings, or districts that would alter any of the characteristics that would qualify the resource for inclusion in or eligibility for the National Register of Historic Places. For purposes of §106, the determination would be *no historic properties affected*.

Minor adverse: The action would affect a feature(s) of a National Register of Historic Places-eligible or -listed structure, building or district, but would not alter its character-defining features, nor would the action diminish the overall integrity of the property. For purposes of §106, the determination of effect would be *no adverse effect.*

Minor beneficial: The action would maintain the character-defining features of a National Register of Historic Places-eligible or -listed structure, building, or district in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (NPS 1995b) For purposes of §106, the determination of effect would be *no adverse effect*.

Moderate adverse: The action would alter a character-defining feature of the structure or building but would not diminish the integrity of the resource to the extent that its National Register eligibility is jeopardized. For purposes of § 106, the determination of effect would be *adverse effect*.

Moderate beneficial: Positive actions would be taken to help preserve character-defining elements of a structure, building, or district in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties (*NPS 1995b). For purposes of §106, the determination of effect would be *no adverse effect*.

Major adverse: The action would alter a character-defining feature(s) of the structure, building, or district, seriously diminishing the overall integrity of the resource to the point where its National Register eligibility may be in question. For purposes of §106, the determination of effect would be *adverse effect*.

Major beneficial: The action would noticeably enhance the character-defining features of a structure or a building that represent important components of the nation's historic heritage, and would foster conditions under which these cultural foundations of the nation and modern society could exist in productive harmony and fulfill the social, economic, and other requirements of present and future generations. Enhancement would be in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (NPS 1995b). The §106 determination of effect would be *no adverse effect*.

Impairment

A major, adverse impact occurs to a historic structure, building, or district whose conservation is necessary to fulfill specific purposes identified in the establishing legislation of the park; key to the natural or cultural integrity of the park; or identified as a goal in the park's general management plans or other relevant NPS planning documents.

Methodology for Cultural Landscapes

Cultural landscapes represent a complex subset of cultural resources resulting from the interaction between people and the land, and reflect the influence of human beliefs and

actions over time on the natural landscape. Cultural landscapes are a living record of an area's past, providing a visual chronicle of its history.

For a cultural landscape to be listed in the National Register, it must possess significance (the meaning or value ascribed to the landscape) *and* have integrity of those features necessary to convey its significance. The character-defining features of a cultural landscape include spatial organization and land patterns; topography; vegetation; circulation patterns; water features; and structures or buildings, site furnishings, and objects.

Impacts on cultural landscapes were evaluated using the process described beginning of this section. Definitions of intensity levels for cultural landscapes are as follows:

Negligible: Effects of the action would be barely perceptible and would not affect cultural landscape resource conditions either beneficially or adversely. For purposes of §106, the determination would be *no historic properties affected*.

Minor adverse: The action would affect a pattern, feature, or vegetation in the cultural landscape but would not diminish the overall integrity of the landscape. For purposes of §106, the determination of effect would be *no adverse effect*.

Minor beneficial: Impacts of the action would help maintain existing landscape patterns and features in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. For purposes of §106, the determination of effect would be *no adverse effect*.

Moderate adverse: The action would alter a character-defining feature of the cultural landscape but would not diminish the integrity of the landscape to the extent that its National Register eligibility is jeopardized. For purposes of § 106, the determination of effect would be *adverse effect*.

Moderate beneficial: The action would improve the cultural landscape in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes.* For purposes of §106, the determination of effect would be *no adverse effect.*

Major adverse: The action would alter patterns or features of the cultural landscape, seriously diminishing the overall integrity of the resource to the point where its National Register eligibility may be in question. For purposes of §106, the determination of effect would be *adverse effect*.

Major beneficial: The action would actively enhance and improve the landscape in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. For purposes of §106, the determination of effect would be no adverse effect.

Impairment

A major, adverse impact occurs to a cultural landscape whose conservation is necessary to fulfill specific purposes identified in the establishing legislation of the park, key to the natural or cultural integrity of the park, or identified as a goal in the park's general management plans or other relevant NPS planning documents.

Methodology for Museum Collections

Impacts on museum collections are evaluated using NEPA terminology.

Negligible: Effects of the action would be at the lowest levels of detection – barely measurable with no perceptible consequences, either adverse or beneficial, to museum collections.

Minor adverse: The action would affect the integrity of few items in the museum collection but would not degrade the usefulness of the collection for future research and interpretation.

Minor beneficial: The action would contribute to stabilization of the current condition of the collection or its constituent components to minimize degradation.

Moderate adverse: The action would affect the integrity of many items in the museum collection and diminish the usefulness of the collection for future research and interpretation.

Moderate beneficial: The action would improve the condition of the collection and help protect its constituent parts from the threat of degradation.

Major adverse: The action would affect the integrity of most items in the museum collection and destroy the usefulness of the collection for future research and interpretation.

Major beneficial: The action would secure the condition of the collection as a whole or its constituent components from the threat of further degradation.

Impairment

A major adverse change would occur to the park's collections whose conservation is necessary to fulfill specific purposes identified in the establishing legislation of the park, key to the cultural integrity of the park, or identified as a goal in the park's general management plan or other relevant NPS planning documents. The change would be permanent and would preclude the use and enjoyment of these cultural resource(s) by future generations.

Cumulative effects

Cumulative effects that would occur within and outside this area were determined based on the "Cumulative Effects Analysis Method" section. Cumulative effects on cultural resources were determined by combining the impacts of each alternative with other past, present, and reasonably foreseeable future actions.

Other important actions that occurred in the past and will continue into the future include the deterioration of cultural sites and structures from development, wind, weather, erosion, rodent activity, vegetation, vandalism, and unauthorized collection. Cultural resources are non-renewable, so over time these various threats cumulatively diminish the regional resource base, and reduce the number and variety of cultural sites available for visitor appreciation, ethnographic heritage, and scientific study.

Impacts of Alternative A: No Action/Continue Current Management

Archeological Resources

No new adverse effects would occur to archeological resources except for areas where future flooding and continuing erosion could uncover artifacts related to human use in this area.

Most damage would occur to those sites in the immediate vicinity of Hoover Creek, such as archeological sites 13CD147 and 13CD150. The potential for loss of some archeological materials in selected areas would continue, resulting in minor to moderate, long-term, localized adverse effects.

Historic Structures, Buildings, and Districts

Buildings and their furnishings, and historic structures such as the walls along Hoover Creek near the Downey Street Bridge, would continue to be threatened by flooding. Figure 2 (in the Purpose and Need section) shows the structures that could be affected during different flood events (5-, 10-, 25-, 50- and 100-year events). Even a relatively small flood event could affect important structures such as the Library-Museum and Friends Meetinghouse.

If water should enter buildings such as the Friends Meetinghouse, both interior and exterior structural materials could be damaged, along with the furnishings. While the Presidential Library-Museum is not a historic structure, the building is an integral part of the landscape and holds collections vital to the history of Hoover and his presidency. The preservation of this structure is imperative.

During a major event, such as a 100-year flood, direct effects on the historic structures could include physical damage to structural elements such as foundations and siding from water and floating debris. Ancillary structures such as the Isis Statue, benches, fences, steps, or walkways could be lost to floodwater or damaged by debris.

Water from the west branch of Wapsinonoc Creek would continue to back up around the Friends Meetinghouse, so existing protection would be continued for this historic structure. This protection includes drainage tiles with passive drainage to the creek, backflow prevention, external mastic sealant on basement walls, and a sump and pump. (Note that protective coatings must be reapplied on a periodic basis, and buildings must be checked regularly to ensure that cracks are filled and other routine maintenance performed, and that all systems are in working order.) Continuation of existing protection would reduce the potential threats from flooding and backwater to the Friends Meetinghouse, resulting in long-term moderate beneficial effects.

Preventative measures such as sandbags and protective coatings also would help prevent direct damage to most of the structures and their contents. Sump pumps have been installed in some other buildings, and other measures would be taken to ensure that drainage systems are working. Even though preventative measures might keep floodwater out of buildings and basements during a flood event, the high water table, standing water in the vicinity, and the humid climate would continue to create ideal conditions for the growth of mold and percolation of moisture into structure foundations and interiors.

The historic stone wall, which was installed to help protect the nearby Isis Statue, is in poor condition. Repeated floods, even those of a 10-year magnitude, would continue to eat away incrementally at the soil around this structure. Loss of the historic wall would be an adverse effect, and could eventually lead to damage to the adjacent statue. The wall, bridge, and the statue are important elements of the historic district. Flooding also could contribute to erosion around the bridge abutments, contributing to its deterioration. On-going maintenance activities would need to be initiated to reduce the potential for loss of the wall or damage to the bridge.

Continuation of existing conditions would result in long-term, localized, adverse effects on historic buildings, structures and their furnishings. With mitigation (best management practices) these effects would vary from negligible to moderate, depending upon the preventative measures chosen for individual structures, as well as the flood timing, intensity, duration, and water depth.

Cultural Landscape

Historic structures, buildings, and small scale features and objects such as fences, signs, and benches form an integral part of the cultural landscape. Effects on some of the structures that are also landscape elements are discussed above, but it should be noted that damage to these resources would, by changing character-defining features, diminish the integrity of the landscape as well.

Other character-defining features of the cultural landscape include the spatial organization and land patterns, topography, vegetation, circulation patterns, and water features. Most of these landscape features would not be noticeably affected by continuation of existing conditions. However, existing conditions include a "weedy" appearance along the stream corridor that obscures important views and detracts from overall impression and commemoration. Most of the adverse effects on the landscape would be short-term, minor, and localized. That is, effects would last until the water recedes, flood debris and mud is cleaned up, and shrubs and plantings receive routine landscape maintenance.

However, flooding would continue to cause changes in the channel and appearance of Hoover Creek, and could undermine and topple large trees that are an important landscape element. Flooding would hasten bank scouring and collapse, and could eventually force changes in circulation patterns and visitor access. As described for Historic Structures, Buildings, and Districts, continued flooding would have both short- and long-term, negligible to moderate, parkwide, adverse effects on the cultural landscape.

Collections

Although emergency operations and disaster plans provide guidance for care of collections during an event such as a flood, there would still be the potential for collections loss or damage. Moving furnishings and collections out of the flood unit prior to a major flood event would help protect these resources from direct damage but secondary effects from the moving process could result. The collections include items specifically chosen to interpret the story of Herbert Hoover and his presidency. Many of these items are antiques made fragile by the passage of time. Some are housed in historic structures, and may suffer water or mildew damage, or may be harmed or lost in the process of being relocated.

Many of the archival materials housed in the Presidential Library-Museum also are irreplaceable. Even though the Library-Museum has its own disaster plan, the effects of flooding on archival materials are likely to be similar to the effects on park collections. That is, there may not be adequate time to move furnishings and artifacts systematically when a flood threat occurs, leading to the possibility of items being misplaced or lost. Physical damage could be incurred during the moving process. Changes in environmental conditions (especially temperature and humidity) would contribute to deterioration of collections over time. Although losses or severe damage would probably be rare, there would be potential for

long-term, minor to moderate, localized, adverse effects to collections, both in the park and Presidential Library-Museum, during an emergency or disaster event.

Cumulative Effects. Regional development of new homes, golf courses, businesses, and transportation systems is on-going, and, along with unauthorized collecting, contributes to the incremental loss of archeological resources. Other park and city plans could contribute incrementally to these losses. The city of West Branch will be installing a new water main along the fence line between Thompson Farm and the prairie. The park has several plans such as the fire management plan, prairie management plan, new maintenance facility, and a tree replacement plan that would create ground disturbance. With use of best management practices, these plans would be likely to have only a long-term, minor, adverse effect on cultural resources. However, when the regional losses are taken into consideration, continuation of existing conditions would contribute only minimally to the overall loss of archeological resources regionally. However, these archeological resources are non-renewable, and what is lost can never be regained.

The same is true for historic structures and cultural landscapes. Each year, historic structures in the region have been rebuilt, moved, demolished, or lost to weather and time. New freeways and modern buildings diminish landscapes that reflect the history of the area. These losses cannot be easily rectified, and losses are likely to continue into the future. At present, the park has preserved a number of historic buildings representative of the area as it appeared during Hoover's childhood. These buildings are in use, so small maintenance problems would continue to be addressed before severe damage is done, and these structures would continue to be preserved in their existing condition. However, because of their location near Hoover Creek, structures such as the Friends Meetinghouse would continue to be vulnerable to damage during heavy flooding. Furnishings and other collections were acquired for specific park and archival purposes, and some may be virtually irreplaceable. Damage to these items would diminish the number and types of items available for study and interpretation of the Hoover boyhood and presidential years on a national level. Overall, Alternative A would contribute a long-term, minor, adverse effect to cultural resources.

When the effects on cultural resources from past and ongoing activities are added to the expected future effects under Alternative A, the resulting cumulative effects would generally be long-term, minor, localized, and adverse because the small size of the park and limited number of structures and landscapes potentially affected would tend to reduce the park's contribution to overall regional cumulative effects. However, many of the collections within the park and at the Presidential Library-Museum are "one-of-a-kind" and are of national importance, so damage to these resources would be a long-term, moderate, localized, adverse cumulative effect.

Conclusion. Under existing conditions, long-term, localized, adverse effects on archeological resources would be minor to moderate from continuing bank erosion. Long-term, localized, adverse effects on historic buildings, structures, and furnishings would vary from negligible to moderate, depending upon preventative measures, flood timing, intensity, duration, and water depth. Continuation of existing treatments for the Friends Meetinghouse would confer long-term moderate benefits. Damage to the cultural landscape would be parkwide, adverse, both short- and long-term, and range from negligible to moderate, depending upon the amount of damage to landscape elements. There would be potential for long-term, minor to moderate, localized, adverse effects to collections.

Alternative A would not result in impairment of cultural resources or values.

Impacts of Alternative B: Provide 10-Year Flood Protection

Improvements proposed in all four of the action alternatives include channel and floodplain cross section improvements, remeandering of the stream course, installation of a grade control structure, installation of storm water management ponds or underground oil-water separators, and replacement of dense bank-side vegetation with low-profile, rough plantings that do not require mowing. All of these improvements would have an effect on cultural resources.

Archeological Resources

Channel improvements, installation of storm water ponds/oil-water separators, and revegetation would have the potential to damage or destroy archeological resources. During the mid-20th century, soils were imported from elsewhere in the park to raise the ground level near the creek in the hopes of preventing flooding (NPS 1995a). These imported soils may overlie and obscure buried historic archeological resources such as historic dumps and structural remains. Channel and floodplain cross section improvements, creation of storm water ponds or installation of soil-water separators, and installation of a grade control structure would necessitate removal of vegetation and soils from creek banks and the stream course. In the process of moving vegetation and soil, historic dumps and other buried cultural materials could be dislodged from their depositional context, damaged, or lost.

Remeandering would create a much larger area of disturbance than the other improvements, so it has more potential to have an adverse effect on archeological resources. While remeandering would not be conducted within the Historic Core Stream Management Unit where archeological resources have been documented, disturbance of large quantities of soil in other areas in order to remeander the stream channel would have the potential to encounter archeological resources. There is the potential for archeological resources to have been deeply buried in and along the stream terraces by centuries of flooding and wind born soils, and the project could adversely affect these resources.

In recognition of this potential to adversely affect significant resources, a Programmatic Agreement (PA) was developed between the National Park Service and the Iowa State Historic Preservation Officer (NPS 2006b) to provide direction for protection of historic properties before and during project work (see the Programmatic Agreement in Appendix F; also see the Section 106 Summary, below, for additional details). This Programmatic Agreement requires that prior to initiation of ground-disturbing improvements an archeological testing and inventory plan would be developed for areas likely to be impacted by the undertaking. Archeological investigations, including pedestrian surveys and subsurface testing would be conducted as appropriate to identify the presence of cultural resources within the area of potential effect. These investigations would take into consideration the possibility that design changes could occur prior to or during construction.

The National Register significance of discovered artifacts, features, and sites would then be evaluated, and strategies developed for the protection of resources deemed eligible for the register. If National Register-eligible archeological resources could not be avoided during the project, provisions outlined in the programmatic agreement between the National Park

Service and the Iowa SHPO would be followed. Project work would be archeologically monitored, and stop-work provisions would be included in construction documents.

With best management practices, described in Table 7, including avoidance of known sites and careful design of channel improvements, remeandering plans, and underground oil-water separators or small storm water management ponds, effects on archeological resources would be long-term, localized, negligible to moderate, and adverse, with the intensity depending upon the nature and location of the resources and the amount of disturbance from construction. In selected areas, long-term, localized, moderate benefits would be gained by stream improvements that slow the rate of downward and lateral cutting and bank sloughing that erode nearby archeological resources.

Historic Structures, Buildings, and Districts

Implementation would achieve 10-year flood protection for most of the area within most of the park, but the Friends Meetinghouse, Scellar's Barn, the Visitor Center, and maintenance facility would still be within the potential flood unit, and water could approach the foundations of other structures (see Figure 2). Areas around structures such as the maintenance buildings and Visitor Center also could become water-logged by backwater from the west branch of Wapsinonoc Creek. Note that the protection levels are relative to the current 10-, 15-, 25-, and 50-year flood levels. If actions are taken to provide protection for the 50-year flood, then the rain event that produced a 30-year event would have backwatering potential of the lesser event. Short- and long-term adverse effects of flooding, debris, and moisture could vary from negligible to moderate, depending upon the effectiveness of the park's emergency plans.

To prevent damage to the most important of these structures, the park would recommend that waterproofing be applied to the Library-Museum. Maintenance equipment would be evacuated from the maintenance facility when flooding is imminent. (Scellar's Barn, the Visitor Center, and the maintenance buildings are not considered historic structures.) Waterproofing at the Library-Museum would provide protection from flood events up to approximately the 25-year event. Backwater from the west branch of Wapsinonoc Creek would still pond around the Friends Meetinghouse, but existing protection (drainage tiles, backflow prevention, sump and pump, and external mastic sealant) would continue to provide flood protection up to and including 100-year events, a long-term, localized, moderate benefit.

Cultural Landscape

In the short-term, implementation would have localized, minor adverse effects on plant elements of the cultural landscape. Removal of soil, trees and shrubs along the creek, creation of new meanders in the stream course, and changes in the profile of the stream channel would expose bare soils to erosion and leave the area with an uncharacteristically raw, patchy, unfinished appearance until vegetation is reestablished. These short-term effects would last only until vegetation has regrown.

It should be noted that some elements of a cultural landscape are dynamic and are not meant to be "frozen" at one point in time. Plants grow, die and are replaced, in kind or by new

types. Some plants tend to outcompete others, resulting in changes in vegetation type and magnitude over time, and other landscape changes may reflect new human uses of the site.

The park's cultural landscape has seen numerous changes over the past 75 years. Land was acquired, period structures were added and corresponding changes made in the landscape features and vegetation. With Hoover's death the view between the Gravesite and the Birthplace Cottage emerged as an important landscape consideration. Increasing development in the city of West Branch contributed to the down-cutting of Hoover Creek, changing a small drainage along a grassy swale into a permanent watercourse. Trees and landscaping plants have proliferated in an unplanned manner along the creek. These factors all have contributed to changes in the cultural landscape.

Thus the improvements proposed would help return the area along the creek to a more historic appearance as seen during and shortly after Hoover's presidency and would help to maintain this appearance by preventing further down-cutting by the stream, a long-term, moderate, parkwide, benefit to the landscape.

The historic wall along the creek would be reconstructed during the improvement project. During construction, care would be taken to see that, wherever possible, the removed stones from the walls would be saved and reused. The replacement walls would be constructed using the same materials, design, and massing so that the character-defining features and historic appearance would be retained. This wall reconstruction, along with the protection afforded buildings by waterproofing, would be a long-term, moderate, localized benefit on historic landscape elements and would help protect other landscape structures such as the Isis Statue.

No other buildings or landscape structures would be removed or altered. The project would preserve important specimen trees and plants that contribute to the landscape. Replacement plantings would be chosen for their compatibility with the cultural landscape. The materials and design of the grade control structure would be carefully planned to closely resemble features of the stream environment. The view between the Birthplace Cottage and the Gravesite would be retained. Within a few years only a practiced eye would be able to pick out the areas where changes had been made in this reconfigured streamside landscape, and improvements to Hoover Creek would help prevent flood damage and mud deposition on vegetated areas along the stream. Short-term, minor, localized, adverse effects would result from stream improvement activities that remove plants and soil. Long-term effects would be moderate, parkwide, and beneficial by reducing the adverse effects of flooding, preserving historic features, and installing plantings for compatible with the landscape.

Collections

Implementation would have long-term, moderate, localized benefits on collections, especially those on display in the furnished structures, the Visitor Center, and those held by the Library-Museum. With waterproofing applied to foundations of two major structures, collections would benefit from a drier, more stable interior climate. The risk of damage to collections from water invading the building or from the process of moving sensitive items above the flood unit would be reduced or eliminated.

However, as described above, moisture collecting beneath other buildings would still pose a long-term threat to collections and furnishings, especially in buildings that lack humidity

controls. With best management practices, long-term, localized, adverse effects on collections would range from negligible to minor, depending upon the individual situation and upon the flood timing and intensity.

Cumulative Effects. Cumulative effects of other projects, plans, and local development on cultural resources would be the same as those described for Alternative A. Alternative B would not contribute measurably to the cumulative losses on a regional basis. The same would be true for historic structures and landscapes where regional losses would continue. Because of the nature of the collections in the park and the Library-Museum, improvements in Hoover Creek would contribute a long-term, moderate benefit to the preservation of collections locally and regionally, producing a long-term, minor, beneficial, cumulative effect.

When the effects on cultural resources from past and ongoing activities are added to these expected future effects, the resulting cumulative effects to archeological resources and historic structures and landscapes would be long-term, minor, localized, and adverse, while effects on collections would be beneficial, localized, and minor.

Conclusion. With best management practices, long-term, localized, adverse effects on archeological resources would range from negligible to moderate, depending upon the nature and location of the resources and the amount of disturbance from construction. (Site avoidance and other preventative measures before and during construction would reduce the potential for resource damage.) In selected areas, long-term, moderate benefits to archeological resources would be gained by stream improvements that slow the rate of incising and bank loss.

Continuation of existing protection at the Friends Meetinghouse would be a long-term, moderate beneficial effect. There would be a long-term, moderate, localized, beneficial effect on the Library-Museum if its foundation were waterproofed. However, flood events higher than a 10-year event would have an incrementally increasing range of long-term, localized, adverse effects on other historic structures in the park. Adverse effects also could result from flood debris and moisture. These effects could vary from negligible to moderate, depending upon the effectiveness of the park's emergency plans when dealing with a variety of flooding factors (rate of rise and fall, depth, velocity, amount of backwater from Wapsinonoc Creek, etc.).

In the short term, Alternative B would have localized, minor, adverse effects on elements of the cultural landscape during construction. Over the long term, removal of selected trees and shrubs along the creek, creation of new meanders in the stream course, and changes in the stream profile would help return the creek and the nearby landscape to a more historic appearance and would help to maintain the historic scene by preventing further stream down cutting, a long-term, moderate, parkwide, landscape benefit.

By maintaining existing waterproofing measures, adding sealant to the Library-Museum foundation and constructing stream improvements, long-term, moderate, localized benefits would accrue to collections and furnishings and reduce the risk of damage during emergency transport. Depending upon flood intensity and other factors, moisture collecting beneath buildings would have a negligible to minor, adverse effect on collections.

Alternative B would not result in impairment of cultural resources or values.

Impacts of Alternative C: Provide 15-Year Flood Protection

Archeological Resources

With best management practices, effects on archeological remains would be the same as described for Alternative B (adverse and negligible to moderate, depending upon the nature and location of the resources and the amount of disturbance from construction).

Historic Structures, Buildings, and Districts

Effects on historic structures, buildings, and districts would be much the same as described for Alternative B, except slightly reduced. Adverse effects would be negligible to minor, depending upon a number of factors, including rate of rise and fall, depth, velocity, amount of backwater, etc.

Ponding around the Friends Meetinghouse would still occur, but waterproofing and other existing protection would continue to provide moderate long-term, localized benefits to the building. Effects on non-historic structures would be slightly reduced with the additional protection afforded by application of waterproofing to the foundations at Scellar's Barn and to the permanent structures at the maintenance area, a long-term, minor benefit.

Cultural Landscape

Effects on the cultural landscape would be the same as described for Alternative B (minor, localized, adverse effects during and shortly after construction, and moderately beneficial effects in the long run by returning the area to a more historic appearance).

Collections

Effects on the collections would be similar to those described for Alternative B: long-term, localized, moderate benefits on collections by helping to eliminate threat of flood damage and transport damage. Negligible, localized, adverse effects could continue from moisture trapped beneath structures. Collections and furnishings in non-historic structures such as the Visitor Center would benefit because of installation of flood-proof entrance shields.

Cumulative Effects. Cumulative effects would be the same as described for Alternative B.

Conclusion. Effects on archeological resources and historic structures would be the same as described for Alternative B: long-term, negligible to moderate, adverse effects on archeological resources from ground disturbing actions, and moderate benefits to selected archeological resources along the creek that would be protected from flooding.

Negligible to minor, parkwide, adverse effects would occur to historic resources from creek and retention improvements, along with long-term, localized, moderate benefits. Maintenance of existing protection would confer long-term localized moderate benefits on the Friends Meetinghouse. Adverse effects on non-historic structures would be reduced under this alternative, conferring long-term, minor, localized benefits on these buildings. Effects on the cultural landscape would be the same as described for Alternative B: long-term, moderate, parkwide benefits from restoration of the historic scene; short-term, minor, localized, adverse effects from construction. Alternative C would have long-term, moderate, localized benefits on collections and furnishings by reducing the potential for damage although localized, adverse effects could continue from moisture trapped beneath buildings.

Alternative C would not result in impairment of cultural resources or values.

Impacts of Alternative D: Provide 25-Year Flood Protection

Archeological Resources

Although there are documented sites in the general area, no archeological resources have been documented in the vicinity of the proposed detention area. While there is always some potential for buried but unidentified resources to be present along a stream channel, the Prairie Stream Management Unit was in farmland until after its acquisition by the NPS. The area has had prior ground disturbance from farming and from flooding. No historic structures or other developments are known from this specific area, so there appears to be a relatively low potential to encounter archeological resources while enlarging the storm water storage capacity. Project work would be archeologically monitored, and stop-work provisions and procedures for resource protection would be included in construction documents. There would be a long-term, localized, negligible, adverse effect on archeological resources from project implementation in this area.

Ground modifying activities in the rest of the park would, however, have more potential to affect archeological resources than as described for Alternative B, because of additional ground modification. With best management practices, careful design of remeandering, avoidance of known sites, and testing and other investigations (including possible data recovery) as detailed in Appendix F, long-term, localized, adverse effects on archeological resources would be minor to moderate, depending upon the nature and location of the resources, the amount of disturbance from construction, and the amount of data recovery required. Some moderate benefits would accrue from improvements to the channel of the creek, helping to deter erosion of nearby sites.

Historic Structures, Buildings, and Districts

The combination of stream course improvements, floodwater detention and waterproofing structural foundations would have long-term, moderate, localized, beneficial effects on historic structures and other park buildings such as the Visitor Center by reducing potential damage from flooding, flood debris, standing water and moisture infiltration. No additional protection, such as waterproofing, would be necessary for the Library-Museum or Scellar's Barn because of reduced flooding extent under this alternative. The Friends Meetinghouse would still be affected by backwater from the west branch of Wapsinonoc Creek, but construction of the detention area could have a modest effect on the extent and duration of the standing backwater. Implementation of Alternative B would result in a long-term, moderate beneficial effect on the Friends Meetinghouse.

Cultural Landscape

The *Herbert Hoover National Historic Site Cultural Landscape Report* identifies the general area where the floodwater detention pond would be located as part of the rural/agricultural setting that consists of adjacent farms, the 81-acre native prairie, and the two streams that meet here to flow through the park as Hoover Creek (NPS 1995). Other than interpretive signs and the nearby roadway, no structures are within the immediate vicinity of the detention area (trails are mowed into the prairie). The only plantings defined for the area are

native Iowa tallgrass and low herbaceous and woody vegetation. No other character-defining cultural landscape features are present.

Once vegetation has been reestablished along the detention embankment, this feature would be less obvious, and its appearance would be relatively unobtrusive. The detention pond would hold water only during and immediately after high precipitation events. The area would return to its pastoral appearance thereafter. The area is outside the viewshed of the main part of the park so the detention area would not intrude on the historic or commemorative nature of the rest of the park. Modification of this natural area would have only negligible effects on the park's cultural landscape.

Over the long-term, ground modifications throughout the rest of the park would result in long-term, moderate, parkwide, benefits to the cultural landscape, because improvements to the stream would help return the historic ambiance associated with the Hoover years. These modifications would have short-term, direct, minor, adverse effects on the cultural landscape from removal of vegetation and soils. Much of the landscape that is now subject to flooding would be protected under Alternative D, resulting in long-term, moderate, parkwide, beneficial effects to the cultural landscape.

A few direct adverse effects on the rest of the cultural landscape could occur, as ponding of backwater from the west branch of Wapsinonoc Creek would still cause some short-term, minor, localized, adverse effects in the areas around the Friends Meetinghouse and the maintenance facility, but the incidence of back watering would be reduced considerably by impoundment that reduces Hoover Creek's contribution to backwatering.

Collections

Effects would be the same as described for Alternative B, except that by detaining some of the floodwater, there would be a reduced potential for flood damage to collections during transport to safer areas or by long-term moisture infiltration and mold. Benefits to the collections would be long-term, moderate, and localized.

Cumulative Effects. Cumulative effects on cultural resources would be the same as described for Alternative B, except that by installing a floodwater detention area, potential damage to the park's historic structures, landscapes, and collections would be reduced. When the effects on cultural resources from past and ongoing activities are added to these expected future effects, the resulting cumulative effects on archeological resources and historic structures and landscapes would be negligible, localized, and adverse, while effects on collections would be beneficial, localized, and minor.

Conclusion. There would be a long-term, negligible, localized, adverse effect on archeological resources from project implementation in the floodwater detention area. In other areas, long-term, adverse effects on archeological resources from construction activities would be minor to moderate, and some long-term, moderate benefits to selected features would accrue from improvements to the creek channel.

Stream course improvements, floodwater detention, and waterproofing structural foundations would have long-term, localized, moderate, beneficial effects on historic structures and other park buildings. Ponding of water that backs up from Wapsinonoc Creek would still cause some short-term, minor, adverse effects in the area around the maintenance buildings.

Benefits to the collections would be long-term, localized, and moderate.

Creation of a detention area would have only negligible effects on the park's cultural landscape. Improvements to the creek would have short-term, minor, adverse effects on the cultural landscape from removal of vegetation and soils. Long-term, parkwide, moderate benefits would result from modifications that help return the area's historic ambiance. Stream improvements also would have long-term, moderate, localized benefits by reducing damage to plants and landscape structures from flood debris, erosion, and soil deposition.

Alternative D would not result in impairment of cultural resources or values.

Impacts of Alternative E: Provide 50-Year Flood Protection, the Preferred Alternative

Archeological Resources

Effects would be the same as described for Alternative D, except that an increase in size of the excavated area marginally increases the potential to encounter archeological resources. Project work would be archeologically monitored, and stop-work provisions would be included in construction documents.

With best management practices, long-term, adverse effects on archeological resources in areas where remeandering and other stream improvements are proposed would be the same as described for Alternative D (minor to moderate and adverse). In selected areas, long-term, moderate benefits would accrue to archeological resources by stream improvements that slow the rate of downward and lateral cutting and bank sloughing.

Historic Structures, Buildings, and Districts

Effects would be the same as described for Alternative D, except that the larger detention area would provide increased protection from large scale floods. Stream channel improvements and waterproofing structural foundations, combined with floodwater detention would have long-term, moderate, localized, beneficial effects on both historic and non-historic structures by reducing potential damage from flooding, flood debris, standing water and moisture infiltration. While the maintenance facility and Scellar's Barn are not historic structures and still could be affected by flooding, floodwater detention would reduce potential adverse effects, resulting in a long-term, minor, localized, adverse effect.

Floodwaters that back up from Wapsinonoc Creek would continue to pond around the Friends Meetinghouse, but floodwater detention plus maintenance of existing protection as described under Alternative B would have a long-term, moderate beneficial effect.

Cultural Landscape

Cultural landscape effects would be much the same as described for Alternative D. Despite the larger area of excavation, effects on the cultural landscape would not increase (see the discussion under Alternative D). The increased detention pond area would have only negligible, adverse effects on the park's cultural landscape. Effects on the rest of the cultural landscape would be as defined in Alternative D (short-term, minor, adverse effects on the cultural landscape from removal of vegetation and soils and long-term, parkwide, moderate benefits from modifications that would help return the area's historic ambiance). Stream improvements also would have long-term, localized, moderate benefits by reducing damage

to plants and landscape structures resulting from flood debris, erosion, and soil deposition. Ponding of water around Friends Meetinghouse and the maintenance facility would affect some nearby landscape elements, but the adverse effects would be short-term, minor, and localized.

Collections

Effects would be the same as described for Alternative D (long-term, moderate, and beneficial).

Cumulative Effects. Cumulative effects would be the same as described for Alternative D. When the effects on cultural resources from past and ongoing activities are added to these expected future effects, the resulting cumulative effects on archeological resources and historic structures and landscapes would be negligible, and localized, while effects on collections would be minor, beneficial, and localized.

Conclusion. Effects on archeological resources would be the same as described for Alternative D, negligible in the detention area and long-term, minor to moderate, and adverse where meander modifications would occur. Long-term, localized, moderate benefits would result from stabilization of creek banks near sites.

Effects on historic structures and cultural landscapes would be the same as described for Alternative D, except that the extended detention of floodwaters would provide slightly more protection from large scale floods. Modification of the detention pond area would have only negligible, localized, adverse effects on the park's cultural landscape, and effects on the rest of the cultural landscape would be as defined in Alternative B (adverse effects would be both long- and short-term, parkwide, and ranging from negligible to minor). Effects on collections would be the same as described for Alternative D (benefits to the collections would be moderate and long-term).

Alternative E would not result in impairment of cultural resources or values.

SECTION 106 SUMMARY

Over the past 100 years the stream now known as Hoover Creek grew from a modest grassy swale to a permanent incised stream that floods nearby areas, and the creek continues to cut both downward and laterally. Many of the historic resources at Herbert Hoover National Historic Site are within the 100-, 50-, and 25-year floodplains of the creek, and several are threatened by backwater flooding from the west branch of Wapsinonoc Creek. Between 1991 and 2003, the park experienced 18 episodes of flooding that inundated park buildings and infrastructure and interrupted visitor services (NPS 2004a).

The entire park is listed on the National Register of Historic Places and commemorates the birth and boyhood of Herbert Clark Hoover, 31st President, elder statesman, humanitarian, and engineer. Historic structures and landscape features serve to recreate the childhood environment of President Hoover. Also present within the park is the Presidential Library-Museum containing many of Hoover's papers and memorabilia.

This environmental impact statement provides detailed descriptions of five alternatives (Alternative A, the No Action Alternative and action alternatives designated Alternatives B

through E). These alternatives were developed to present viable solutions to the flooding problems. This document analyzes the potential impacts associated with possible implementation of each of the alternatives, and outlines a series of best management practices that would help avoid adverse effects on cultural resources (see "Resource Protection Measures"). Maximum protection for resources is delineated in Alternative E, the Preferred Alternative.

The focus area of potential effect of this final SMP/EIS is upon the stream channel and surrounding floodplain of Hoover Creek, including archeological resources, historic structures, collections, and landscape features that have been and would likely continue to be affected by flooding.

Archeological Resources

Over the years the park has had extensive archeological investigations but has never had a systematic park-wide survey. A recent overview and assessment identified the need for further work and described the 17 Euroamerican archeological sites found within the park (Finney 2005). These investigations and recommendations for site protection and preservation are discussed in the "Affected Environment" section of this document.

Most of the park's known archeological features appear to be far enough removed from Hoover Creek to ensure that they would not be affected by this project. The proposed detention area would be constructed in former farmland that has been previously disturbed by cultivation, flooding, and road building; no archeological resources have been identified in this area.

However, buried resources that may be eligible for addition to the National Register of Historic Places and/or listing in the Iowa Site Record are known to be present in the historic core area of the park. At the present time, it is impossible to say whether the proposed project as described in the preferred alternative would or would not adversely affect archeological resources eligible for the National Register. However, for the purpose of this EIS, given the extent and scope of the project and the historic nature of the area, it is assumed that actions proposed in this final SMP/EIS could have an *Adverse Effect* on the park's archeological resources. Only four of the park's 17 sites have been evaluated for the National Register, so until such evaluations are completed, all unevaluated sites would be treated as if they were eligible for the Register.

In acknowledgment that archeological resources could be adversely affected by actions proposed in this Stream Management Plan, a Programmatic Agreement between the National Park Service and the Iowa State Historic Preservation Office was developed in accordance with Section 106 of the National Historic Preservation Act of 1966. This April 18, 2006 Programmatic Agreement (copy included in Appendix F) provides guidance for further archeological investigations and evaluation of discovered resources under National Register criteria. Some of these provisions are summarized below.

As described in the Programmatic Agreement, Phase I archeological inventory and evaluation of the project area would be conducted prior to any land disturbance or construction activities, and these archeological investigations would take into consideration possible future alterations in the Area of Potential Effect. This work would be guided by an

archeological inventory and testing plan developed by the National Park Service for this project. Project reports would be submitted to the Iowa SHPO.

Phase II of the archeological fieldwork would include, as appropriate and as directed by published guidance, excavation of shovel tests, probe testing, hand-excavated test units, and/or remote sensing. Given the geomorphology of the area along Hoover Creek, deep testing also could be necessary. Deep testing methods would be developed in consultation with the Iowa SHPO staff and NPS specialists.

From what is presently known about archeological resources within the park, it is not expected that human remains or associated items of cultural patrimony would be encountered during this archeological work. Should historic properties of religious or cultural significance to Native American tribes be identified within the Area of Potential Effect for this project, the National Park Service would reopen consultation with the Iowa SHPO, Native American tribes, and other interested parties, and procedures as described in 36 CFR 800.13 would be followed.

Based on the findings from Phase II work (above), the National Park Service would evaluate all discovered resources, using the criteria for evaluation as outlined in the Department of Interior's regulations, 36 CFR Part 60: "National Register of Historic Places." The National Park Service would consult with the Iowa SHPO (and any relevant THPOs) regarding the potential National Register-eligibility of these discovered resources. If the Iowa SHPO and any relevant THPOs concur with the National Park Service determinations, the property(s) would be considered eligible for the register. If agreement cannot be reached, procedures outlined in 36 CFR 800.4 would be followed.

A number of mitigation measures/best management practices are included in this final SMP/EIS (for a full list of Best Management Practices see the table entitled “Mitigation Measures of the Action Alternatives”). Following archeological investigations as described above, additional mitigation measures would be developed in consultation with the Iowa State Historic Preservation Officer (SHPO) as appropriate.

If it is determined that data recovery is necessary, the National Park Service would follow conditions outlined in the Programmatic Agreement (NPS 2006b) as well as the Advisory Council on Historic Preservation’s *Recommended Approach for Consultation on the Recovery of Significant Information from Archaeological Sites* (ACHP 2006). A Phase III archeological data recovery plan and scope of work would be developed for known sites within the Area of Potential Effect that could be adversely affected by the project. This plan would be submitted to the Iowa SHPO and the Advisory Council on Historic Preservation (ACHP) for review and comment. Periodic data recovery progress reports would be submitted to the Iowa SHPO, who would make site visits in order to review the field work. A report detailing the investigations would be prepared and submitted for SHPO review.

Historic Structures and Collections

Alternatives in this final SMP/EIS provide for additional protection for historic structures and collections through a number of different measures including: waterproofing foundations, monitoring and maintaining drainage systems, slowing lateral stream movement and moving the stream channel away from sensitive areas and structures, retarding the flow of

monitoring and maintaining drainage systems, slowing lateral stream movement and moving the stream channel away from sensitive areas and structures, retarding the flow of floodwater, removing vegetation that contributes to flooding, reshaping the stream profile, rehabilitation of the historic walls along the stream, and planting low-profile plant cover to retard erosion. These actions would help eliminate the necessity of temporarily moving collections and furnishings above flood level in all but major flood events, and would, in one way or another, be beneficial to historic structures and collections, resulting in *No Adverse Effects* on these resources under the Preferred Alternative.

Cultural Landscapes

In the 100 plus years since Hoover's birth, the landscape of this area has undergone numerous dynamic changes, resulting in a great deal of earthmoving, planting and replanting, building removal and replacement, and rebirth as a national park. Nineteenth and 20th century cultivation of the adjacent prairies and development of the city of West Branch have contributed to changes in the original landscape. The grassy swale that once drained the area has become an unnamed permanent watercourse (designated in this document as Hoover Creek). Hoover Creek bisects the park, and during the past half century has become deeply incised. It also has cut laterally, has unstable banks, and during flood episodes, threatens the park's historic structures, landscapes, and collections.

A cultural landscape report completed by the National Park Service in 1995 (NPS 1995) details site history, describes existing conditions, analyzes and evaluates the various landscape components (including historic structures), and makes treatment recommendations. An Inventory Unit Summary and Site Plan was developed for the park in 2005 (NPS 2005b). Information presented in the "Affected Environment" section of the final SMP/EIS draws heavily from these cultural landscape documents.

Over the years, various different landscape designs were implemented within the park, resulting in a great deal of change over time and a somewhat fragmented design across the entire park. During the latter part of the 20th century, volunteer trees, shrubs and other landscaping plants have grown in an unplanned manner along and within the stream. Many of these trees and shrubs have tended to out compete other landscape plantings, changing the overall composition of the cultural landscape. This intrusive vegetation not only contributes to the flooding problems, but it tends to obscure important character-defining elements of the landscape.

For these reasons, the alternatives that propose changes in the channel and the meanders of Hoover Creek do not appear to adversely affect the park's historic cultural landscape. Instead, the proposed meanders, channel modifications, and repairs to historic walls along the creek would help return the landscape to a more historic appearance, evocative of the area as it appeared during Hoover's time. Character-defining landscape elements like the Isis Statue, stone walls along the creek, and the view between the Birthplace Cottage and the Gravesite would be enhanced. These elements would be protected during the work to ensure that none would be harmed. Treatment of historic structures and character-defining elements of the cultural landscape would be consistent with National Park Service guidelines and with the Secretary of the Interior's standards. The alternatives focus on reduction of flood damage, so the condition of historic structures that form a salient part of the landscape would be improved as well, resulting in *No Adverse Effects on Cultural Landscapes.*

The draft SMP/EIS was sent to the Iowa State Historic Preservation Officer (SHPO) for review and comment in 2005. Their comments (included in Appendix A) indicate the potential for the project, as described in the preferred alternative, to have an *Adverse Effect* on some historic properties. As described above, the DEIS was revised to reflect the SHPO's comments, and a Programmatic Agreement was developed to help ensure the best possible treatment for the park's cultural resources before, during, and after the proposed project

Pursuant to 36 CFR 800.5, applying the implementing regulations of the National Historic Preservation Act (revised regulations effective August 5, 2004) that address the criteria of effect and adverse effect, the National Park Service finds that implementation of Alternative E, the Preferred Alternative, would have an effect on collections and on National Register-eligible historic structures and cultural landscape elements, but that this effect would not be adverse (*No Adverse Effect)*.

Because there may be presently unidentified, deeply buried archeological resources in the project area of potential effect, this undertaking as described in the preferred alternative has the potential to have an *Adverse Effect* on archeological resources that may be eligible for the National Register of Historic Places. Thus, as required by 36 CFR 800.14(b), a programmatic agreement was developed between the National Park Service and the Iowa State Historic Preservation Office (Appendix F).

Based on the preceding discussion and evaluation of cultural resources, and as required by 36 CFR 800.6, the National Park Service will continue consultation with the Iowa SHPO/THPO, and with other consulting parties as appropriate. The Advisory Council will be notified of the adverse effect finding and the subsequent development of the Programmatic Agreement as mandated by 36 CFR 800.

WATER RESOURCES

Guiding Regulations and Policies

Various Federal Laws, Regulations, Executive Orders, policies, and guidelines are applicable to the National Park Service's management of water resources. A full list of these regulations can be found in Appendix D.

Methodology and Assumptions

Geographic Area Evaluated for Impacts

The geographic area evaluated for effects includes Hoover Creek and its floodplain, to the extent of the 100-year flood, as well as the surface water in the downstream confluence with the west branch of Wapsinonoc Creek.

Impact Criteria and Methodology

Potential impacts to water resources, including stream function, floodplains, and water quality, are assessed given the degree to which stream management would change compared to existing management.

Water resource issues related to existing stream management and potential management actions identified during internal and public scoping include:

- Hoover Creek does not function as a healthy stream; it experiences high rates of erosion and incision, and lateral migration is suspected.
- The incising stream bed is leading to the loss of vegetation that supports wildlife and anchors the riparian area.
- The stream does not have a healthy riparian buffer or support native aquatic communities.
- Stream management activities could potentially affect the water quality of the stream.
- Parking lot runoff from several locations in the park is directed into the creek where it adds to the pollutant load.

Stream Function

Stream function refers to the state of streams and its ability to perform many beneficial functions and processes. A stream is generally considered in proper functioning condition when it has the ability to:

- dissipate stream energy associated with high waterflows, thereby reducing erosion and improving water quality;
- filter sediment, capture bedload, and aid floodplain development;
- establish natural sinuosity that contributes to a dynamic active-floodplain characterized by a balance of sediment deposition and erosion;
- contribute to groundwater recharge;

- develop root masses that stabilize stream banks against cutting action; develop diverse channel characteristics that provide habitat for fish production, waterfowl breeding, and other uses; and
- support a diverse plant and animal community (BLM 2003).

Primary indicators used in this analysis to reveal the ability or inability for the stream to function properly include the stream's flow capacity, channel stability, rate of incising or down-cutting, and lateral movement.

As described in the "Alternatives" chapter, the restoration being proposed is defined as a broad range of actions and measures designed to restore structure and function of a stream in a manner that enables it to function at a self-sustaining level (Federal Interagency Stream Restoration Working Group 1998). It does not involve returning Hoover Creek to a pristine or original condition because this would not be feasible considering the stream's location within a suburban park and the nature of the current conditions and disturbances in the watershed. Therefore, adverse or beneficial effects to stream function consider the ability of the stream to perform functions at a self-sustaining level, as applicable to this particular stream.

Impacts to stream function are assessed in comparison to the existing hydrologic condition of the stream and its indicators and its corresponding ability to perform stream processes. Primary steps for assessing impacts on stream function included identifying 1) the existing stream hydrology and stream condition, with specific reference to its stream condition classification using Rosgen's classification method, 2) potential changes in hydrology and stream conditions from current and future stream management actions, and 3) potential changes in the ability of the stream to perform stream functions. To understand the effects of stream management methods on the function of the stream, park resource inventories and management plans, scientific literature, and published technical data were consulted to identify the information contained in this analysis.

Specific factors used to assess the ability of the stream to perform stream functions include characteristics referenced in Rosgen's stream condition classification, which assist in predicting a stream's behavior from its appearance (Rosgen 1996). Certain observable characteristics provide insight into stream function, such as sensitivity to disturbance, recovery potential, sediment supply, stream bank erosion potential, and vegetation controlling influence. These characteristics help predict potential for channel bank stability and incision, which are presented in the analysis of alternatives.

Floodplains

Floodplains are analyzed in the context of changes in the ability of the floodplain to perform its functions.

The impacts from potential changes in hydrology and stream processes on floodplains and floodplain values and functions, as a natural resource, are included in this analysis. However, impacts from a flood itself or from potential changes in flood recurrence intervals on a particular resource are included in the analysis for that respective impact topic. For example, the effects from flooding on historic structures are included in the "Cultural Resources" analysis, and the potential safety risks posed by flood events are evaluated in "Public Health and Safety," etc.

Primary steps for assessing impacts on floodplains included identifying 1) the floodplain boundaries and recurrence intervals under existing and future development conditions, 2) potential changes in the flood frequency and floodplain boundaries from current and future stream management actions, and 3) potential changes in floodplain functions. To understand the effects of stream management methods on the floodplain, park resource inventories and management plans, scientific literature, and published technical data were consulted to identify the information contained in this analysis.

Water Quality

Water quality refers to meeting federal Clean Water Act and state water quality requirements and to the suitability of surface water for the appropriate designated use for which the state has classified the water body. Particular attention is paid to the potential for the enhancement or degradation of water quality.

Primary steps for assessing impacts included identifying 1) the location of surface water in areas likely to be affected by the proposed alternatives, 2) potential changes in surface water quality from current and future stream management actions, and 3) potential changes in surface water quality caused by stream modifications. To understand the effects of stream management methods on the water quality in specific areas of concern, park resource inventories and management plans, scientific literature, and published technical data were consulted to identify the information contained in this analysis.

Definition of Adverse and Beneficial

Adverse effects would degrade stream function, reduce the ability of the floodplain to mitigate flood flows, or increase pollutant or sediment loading to Hoover Creek. Beneficial effects would enhance stream function, improve the ability of the floodplain to mitigate flood flows, and reduce pollutant or sediment loading to Hoover Creek.

Impact Threshold Definitions

Given the above water resources issues, methodology, and assumptions, the following impact thresholds were established in order to describe the relative changes in stream function, floodplains, and water quality under the stream management alternatives.

Stream Function

Negligible: Stream function would not be affected or the effect would be below or at levels of detection. Changes to the stream's flow capacity, channel stability, incision rate, or lateral movement potential would not be detectable.

Minor: The effects on stream function would be detectable, but effects to the stream's flow capacity, channel stability, incision rate, and/or lateral movement potential would be small.

Moderate: The effect on the stream's flow capacity, channel stability, incision rate, and /or lateral movement potential would be readily apparent and would result in a notable change in the stream's ability to function properly.

Major: The stream's flow capacity, channel stability, incision rate, and /or lateral movement potential would greatly change and would substantially alter the stream's ability to function properly.

Floodplains

Negligible: There would be no measurable change in the ability of a floodplain to distribute floodwaters, or in its values and functions. The project would not measurably contribute to changes in potential flooding.

Minor: Changes in the ability of a floodplain to distribute floodwaters, or in its values and functions, would be measurable and local, although the changes would be only slightly measurable. The project would not contribute to changes in potential flooding.

Moderate: Changes in the ability of a floodplain to distribute floodwaters, or in its values and functions, would be measurable and local. The project could contribute to changes in potential flooding.

Major: Changes in the ability of a floodplain to distribute floodwaters, or in its values and functions, would be measurable and widespread. The project would contribute to changes in potential flooding.

Water Quality

Negligible: Chemical, physical, or biological changes to water quality would not be detectable, and effects would be well within historical or desired water quality conditions and would not contribute to degradation.

Minor: Chemical, physical, or biological changes to water quality would be detectable but would not contribute to degradation, and would be within historical or desired water quality conditions.

Moderate: Chemical, physical, or biological changes to water quality would be detectable but would not result in degradation. Water quality would be altered compared to historical baseline or desired water quality conditions.

Major: Chemical, physical, or biological changes to stream water quality would be readily measurable and would be frequently altered from the historical baseline or desired water quality conditions. Adverse effects would result in degradation of local water quality.

Duration

- Short-term – Upon project completion, recovery would take less than two years.
- Long-term – Upon project completion, recovery would take more than two years.

Impairment

Chemical, physical, or biological changes to water resources, including stream function, floodplains, and water quality, would be widespread, readily measurable, and would be substantially and frequently altered from the historical baseline or desired hydrologic and/or water quality conditions. The impacts would involve deterioration of the park's water resources, to the point that park purposes could not be fulfilled, or resources could not be experienced and enjoyed by future generations.

Impacts of Alternative A: No Action/Continue Current Management

Stream Function

Long-term, moderate, localized, adverse effects on stream function would continue to occur because Hoover Creek would remain unable to achieve proper functioning condition. This is indicated by the rapid rate of incision, down-cutting of the stream bed, and slumping stream banks. In addition, the classification of the stream indicated that it had poor self-recovery potential, which means that once the cause of the instability was corrected the stream would still have difficulty recovering. Current stream management would continue into the future and no changes would take place to help remedy the stream bank instabilities. Peak flows would be slightly reduced due to the implementation of the city's storm water management policy; however, the stream would not be able to recover from its degraded state and would only continue to experience incision, down-cutting, and bank sloughing.

Floodplains

No modifications would be made to alter existing stream management. The hydrology of the area would remain similar as described in "Affected Environment" (Chapter 3), with upcoming storm water management policy reducing peak flows. This is a result of future developments complying with the city's storm water management policy. As a result, the flood recurrence interval would also decrease slightly. The current average stream channel capacity is approximately 315 cfs, which means a flood occurs whenever the flow exceeds this rate. Presently, the stream's average channel capacity is exceeded at flow rates equivalent to a 2-year event. This is considered to fall within the natural range of bankfull discharge (Dunne and Leopold 1978). The frequency of bankfull capacity is unknown, because bankfull conditions are difficult to assess in the poorly functioning condition. Bankfull is significantly less than channel capacity and is probably attained annually or more frequently.

Hoover Creek's average channel capacity would remain the same, while peak flows would only slightly decrease from existing conditions. Therefore, the frequency at which floods are likely to occur would remain similar to existing conditions. There would be no effect on floodplain resources or values.

Water Quality

Current stream conditions contribute sediment to downstream waters as a result of erosion, mass wasting and slumping of banks, and down-cutting of the stream bed. Because of the degraded condition of the stream, it has a very high sensitivity to disturbances (i.e., floods) and low potential to recover from such events. Therefore, the stream would continue to carry high sediment loads as they slough off material from the sides of the bank or from continual down-cutting of the stream bed. In addition, flows would continue to undercut near meanders which eventually slump and fall into the stream. This soil and vegetation also contributes to higher sediment load and adversely affects water quality. These effects would be considered long-term, minor, localized, and adverse.

Water quality would also continue to be adversely affected from parking lot storm water runoff entering the stream and contributing small amounts of pollutants such as petroleum

hydrocarbons into Hoover Creek. This would continue to be a long-term, negligible, localized, adverse effect.

Cumulative Effects.

Stream Function. None of the projects identified for inclusion in the cumulative scenario would have detectable effects on stream function. Changes in local land use and storm water management were integral components of alternatives development and therefore are not included in cumulative analyses. Thus, there would be no cumulative effects on stream function contributed from other projects and plans.

Water Quality. Both the prairie and fire management plans use prescribed fire to restore and maintain vegetative communities. Prescribed fire can result in short-term, adverse effects to water quality if precipitation erodes barren soil and delivers it to nearby waterways. These projects would produce negligible to minor, adverse effects on water quality in the tributaries and Hoover Creek. In conjunction with these effects, cumulative long-term, negligible to minor, localized, adverse effects to water quality would occur.

Floodplains. None of the projects identified for inclusion in the cumulative scenario would have detectable effects on floodplain function. Therefore, no cumulative effects to floodplains would be anticipated.

Conclusion. There would be long-term, moderate, localized, adverse effects to stream function as Hoover Creek would continue to experience rapid incision, down-cutting, and bank sloughing. There would continue to be long-term, minor, localized, adverse effects to water quality from sediment delivery associated with substantial erosion and untreated storm water directly entering the creek. There would not be any modification or changes to the floodplain; therefore, there would be no effect on floodplain resources or values.

Alternative A would not result in impairment of park water resources or values.

Impacts of Alternative B: Provide 10-Year Flood Protection

Stream Function

A portion of the stream channel would be reconfigured and restored to include characteristics of low sensitivity to disturbance, very good recovery potential when disturbed (such as by the 50 or 100-year flow event), low sediment supply, and low stream bank erosion potential. The stream would have improved channel stability and reduced incision. The redesigned channel configuration would more equally distribute water in the channel, compared to the existing configuration where the energy is consistently forced downward. This would help eliminate incision and down-cutting of the stream bed. The placement of a grade control, or "drop structure" just upstream of Downey Street Bridge would help reduce channel degradation by controlling the level of the stream.

The remainder of the channel would be vegetated with low, tough ground cover, which would provide roughness and flow resistance to help retain bank stability and slow flows. Monitoring and channel maintenance activities would occur to ensure the integrity of the vegetative cover is maintained so that bank stability persists as designed.

All of these effects are long-term, localized benefits to the function of Hoover Creek, and would be considered moderate in intensity. Implementation of the restoration elements would provide the opportunity for the stream to achieve proper functioning condition over time.

Short-term, localized, adverse effects to stream function would occur while construction activities take place and until vegetation fully establishes. This is due to the inability of Hoover Creek to function as a stream while it is being realigned and reconfigured. In addition, after construction is complete the channel would be planted with appropriate vegetation; however, until this vegetation is fully established it would not be as successful in bank stabilization.

In the short term, the channel would have the ability to carry flow, but would not necessarily perform other stream processes, such as balanced sediment deposition and erosion and filtering of sediment, to its designed future condition. In addition, the stream would not have the ability to dissipate stream energy associated with high flows as well as would occur when vegetation is fully established. These effects would be partially offset by the new meandering and grade control structure slowing flow energy, as well as the use of mitigation measures to stabilize soil in the stream channel. Such measures could include use of degradable matting made from straw, jute, coconut, or other natural fiber; placement of long-lasting geotextile fabrics or grids that facilitate plant growth; or use of "nurse crops" that grow quickly and are killed by winter temperatures. The intensity of short-term, adverse effects would vary depending on precipitation, but could range up to moderate if heavy precipitation events occur. If a large flood event were to occur, the stream would lack the full ability for self-recovery over the short term, and rehabilitation efforts would likely be necessary.

Floodplains

The channel capacity for Hoover Creek would be increased to 1,050 cfs, compared to the existing 315 cfs, which would provide protection to adjacent structures up to the 10-year flood event. Floods would leave the banks of the channel at approximately a little more than the 5-year flood. In general, the frequency of flooding would be reduced under this alternative to meet the project's long-term goal of protecting important historic and cultural resources from floods. This would be considered a long-term, localized, adverse effect to floodplain resources and values as a result of a slight reduction in such functions as contributing to groundwater recharge and supporting adjacent soils and vegetation because water would be leaving the stream channel less often and would not reach the same elevation. Effects would be considered negligible because the portion of the floodplain adversely affected is located within a suburban park setting with manicured landscaping, and changes would not be very detectable when considering the ecosystem it is supporting.

Clearing of vegetation, debris, bank stabilization, and planting with appropriate vegetation would provide improvements to the ability of the floodplain to dissipate flood energy and experience more natural sedimentation processes. These effects would be long-term, negligible, localized, and beneficial.

Water Quality

The ability of Hoover Creek to function properly would improve and reduce the amount of erosion and sloughing of bank materials. This would consequently reduce the delivery of

sediment into the stream and to downstream waters over the long term. The reduction in the frequency of floods would also minimize the delivery of sediment and debris that occurs during flooding events. There would be a long-term, minor, localized, beneficial effect on water quality. The incorporation of storm water management measures at parking areas to treat water before entering Hoover Creek would also be a long-term, negligible to minor, localized, beneficial effect as it would improve water quality.

There would also be short-term effects to water quality in Hoover Creek and the downstream reach of the west branch of Wapsinonoc Creek. These would result from the potential delivery of sediment during construction. Following construction and before vegetation fully establishes, there would also be the potential for delivery of sediment to downstream waters during heavy precipitation events. These effects would be mitigated with the use of matting or other stabilization methods. These adverse effects would be short-term, localized, and of minor to moderate intensity.

Cumulative Effects.

Stream Function. None of the projects identified for inclusion in the cumulative scenario would have detectable effects on stream function. Therefore, there would be no cumulative effects on stream function.

Water Quality. Effects of other projects and plans would be as described for Alternative A. Short-term effects of Alternative B would be minor to moderate, and adverse. The short-term cumulative effects would be minor to moderate, and adverse. However, the other projects and plans would not generate long-term effects to water quality; therefore there would be no long-term cumulative effects beyond those of Alternative B.

Floodplains. None of the projects identified for inclusion in the cumulative scenario would have detectable effects to floodplain function. Therefore, no cumulative effects to floodplains would be anticipated.

Conclusion. There would be long-term, moderate, localized, beneficial effects to stream function as Hoover Creek would be restored with the potential to achieve proper functioning condition. This alternative would also have long-term, negligible to minor, localized, beneficial effects to water quality from the decreased erosion potential and incorporation of storm water management measures. Floodplain resources and values would be adversely affected in the long term from a reduced frequency and lateral extent of flooding; however these effects would be negligible because they would be offset by the beneficial improvements to the stream corridor. Short-term, localized, adverse effects would range in intensity depending on precipitation, but they could range up to moderate if large events occurred before vegetation fully establishes in the stream channel.

Alternative B would not result in impairment of park water resources or values.

Impacts of Alternative C: Provide 15-Year Flood Protection

Stream Function

All of the components of Alternative B would be included with additional site-specific flood-protection measures. These additional measures would have no effect on stream function as

they would only help to minimize damage to structures themselves. Therefore, effects would be the same as Alternative B. Long-term, moderate, localized, beneficial effects would result from the new channel configuration, grade control, and restoration measures because the stream would experience increased bank stability and reduced erosion, incision, and down-cutting.

The short-term, moderate, localized, adverse effects during and following construction activities would also be the same as described under Alternative B. These effects would occur as a result of the stream lacking the ability to perform stream processes until vegetation is fully established.

Floodplains

Impacts would be the same as described for Alternative B. Long-term, negligible, localized, adverse effects would result from a reduction in flood frequency, while long-term, negligible, localized, beneficial effects would result from improved functions by bank stabilization, vegetation clearing, and planting with appropriate vegetation.

Water Quality

Impacts to water quality would be the same as described for Alternative B.

Cumulative Effects. Cumulative effects would be the same as those described for Alternative B.

Conclusion. There would be the same effects to water resources as Alternative B. This alternative would provide long-term, moderate, localized, beneficial effects to stream function as Hoover Creek would be restored with the potential to achieve proper functioning condition. There would be long-term, minor, localized, beneficial effects to water quality from the decreased erosion potential and incorporation of storm water management measures. Floodplain resources and values would be adversely affected in the long term from a reduced frequency and lateral extent of flooding; however these effects would be negligible because they would be offset by the beneficial improvements to the stream corridor. Short-term, localized, adverse effects would range in intensity depending on precipitation, but they could range up to moderate if large events occurred before vegetation fully establishes in the stream channel.

Alternative C would not result in impairment of park water resources or values.

Impacts of Alternative D: Provide 25-Year Flood Protection

Stream Function

All of the components of Alternative B would be included with the addition of creating detention storage upstream in the Prairie Stream Management Unit. Long-term, moderate, localized, beneficial effects would be the same as described for Alternatives B and C because the target stream condition would be the same. Because this alternative would have the increased ability to moderate the release of flows into the stream channel, short-term, localized, adverse effects could be less intense than effects of Alternatives B and C. Although the stream would have the reduced ability to perform stream functions for a short duration, the release of storm flow from the created detention area would be regulated for up to the 25-

year flood event. Therefore, short-term, localized, adverse effects would be minor to moderate in intensity.

Floodplains

Effects would be similar to the effects described above for Alternatives B and C. The additional storage would further reduce the flood frequency, and flooding would generally occur with events greater than the 25-year recurrence interval. The upstream storage would allow a moderated release of flow, at approximately 1,050 cfs. Similar to Alternatives B and C, floodplain resources and values would be adversely affected from this reduced frequency and lateral extent of flooding. There would be long-term, negligible, localized, adverse effects to floodplain resources and values from a slight reduction in such functions as contributing to groundwater recharge and supporting adjacent soils, vegetation, and wildlife habitat.

Similar to Alternatives B and C, there would also be long-term, localized, beneficial effects from bank stabilization and vegetation removal/planting activities. The creation of upstream storage in the Prairie Stream Management Unit would also have beneficial effects as a more natural floodplain would be created that would have native prairie vegetation. Ponding would occur for events greater than the 5-year flood, which would give the area an opportunity to perform as a natural floodplain, including the functions of dissipating flood energy, creating wildlife habitat, improved soils and vegetation quality, sediment retention, groundwater recharge, and potential water quality improvements. Alternative D would have long-term, minor to moderate, localized, beneficial effects to floodplain resources and values.

Water Quality

Impacts would be similar to those described for Alternatives B and C, with the exception that more disturbance would be associated with the creation of upstream detention. Long-term, minor, localized, beneficial effects would occur over the long term from the reduction of erosion, bank sloughing and down-cutting, and incorporation of storm water management measures at parking lots to improve water quality of runoff.

This alternative would also have the potential for long-term, negligible, localized, beneficial effects as the created detention storage could assist in sediment and nutrient filtering and bacteria reduction by ultraviolet degradation (EPA 2004). This would improve the quality of water leaving this area during events greater than the 5-year recurrence interval.

A larger area of disturbance would occur, which would expose soils over the short term. This would increase the potential for sediment delivery into Hoover Creek and to the west branch of Wapsinonoc Creek. These short-term, localized, adverse effects could be minor to moderate in intensity if heavy precipitation events occur before vegetation fully establishes.

Cumulative Effects.

Water Quality. The prairie and fire management plans would generate short-term, negligible to minor, adverse effects to water quality. In combination with these effects, short-term, minor to moderate, localized, adverse cumulative effects would occur. Because other projects and plans would not generate long-term effects to water quality, there would be no long-term cumulative effects beyond those of Alternative D.

As described for Alternative B, there would be no cumulative effects to stream function or floodplains.

Conclusion. Alternative D would provide long-term, moderate, localized, beneficial effects to stream function as Hoover Creek would be restored with the potential to achieve proper functioning condition. There would also be long-term, minor, localized, beneficial effects to water quality from the decreased erosion potential and incorporation of storm water management measures. Floodplain resources and values would be adversely affected in the long term from a reduced frequency and lateral extent of flooding; however these effects would be negligible in intensity. There would be long-term, minor to moderate, localized, beneficial effects to floodplain resources and values from improved function from enhancement of the stream corridor and creation of upstream storage. Short-term, localized, adverse effects would range in intensity depending on precipitation, but they could range up to moderate if large events occurred before vegetation fully establishes in the stream channel.

Alternative D would not result in impairment of park water resources or values.

Impacts of Alternative E: Provide 50-Year Flood Protection, the Preferred Alternative

Stream Function

There would be the same long-term, moderate, localized, beneficial effects as in Alternatives B, C, and D because the target stream condition would be the same. Short-term, adverse effects would be the same as those described for Alternative D. Although the stream would still have the reduced ability to perform stream functions for a short duration, the release of storm flow from the created detention basin would be regulated for up to the 50-year flood event. Short-term, localized, adverse effects would be minor to moderate in intensity.

Floodplains

Effects would be similar to the effects in Alternative D, with the exception of further reduction in flood frequency and a greater area of upstream detention storage. The additional storage would further reduce the flood frequency, and flooding would generally occur with events greater than the 50-year recurrence interval. Flows being released from the upstream storage area would be moderated at approximately 1,050 cfs, which would not be expected to spread out onto the adjacent floodplain. This reduced frequency and lateral extent of flooding would have long-term, negligible localized, adverse effects to floodplain resources and values from a slight reduction in such functions as contributing to groundwater recharge and supporting adjacent soils, vegetation, and wildlife habitat. These effects would be offset by long-term, minor to moderate, localized, beneficial effects from the creation of upstream detention storage and creation of a more natural floodplain that can perform natural floodplain processes.

Water Quality

Effects to water quality would be the same as those for Alternative D.

Cumulative Effects. Cumulative effects would be the same as those for Alternative D.

Conclusion. Effects would be the same as those described for Alternative D. There would be long-term, moderate, localized, beneficial effects to stream function as Hoover Creek would

be restored with the potential to achieve proper functioning condition. There would be long-term, minor, localized, beneficial effects to water quality from the decreased erosion potential and incorporation of storm water management measures. Floodplain resources and values would be adversely affected in the long term from a reduced frequency and lateral extent of flooding; however these effects would be negligible in intensity. There would be long-term, minor to moderate, localized, beneficial effects to floodplain resources and values from improved function from enhancement of the stream corridor and creation of upstream storage. Short-term, localized, adverse effects would range in intensity depending on precipitation, but they could range up to moderate if large events occurred before vegetation fully establishes in the stream channel.

Alternative E would not result in impairment of park water resources or values.

VISITOR UNDERSTANDING AND APPRECIATION

Guiding Regulations and Policies

Various Federal Laws, Regulations, Executive Orders, policies, and guidelines are applicable to the National Park Service's management of visitor access to park amenities and the quality of the visitor experience. A full list of these regulations can be found in Appendix D.

Methodology and Assumptions

Geographic Area Evaluated for Impacts

The geographic area evaluated for visitor understanding and appreciation is the area adjacent to the stream corridor, and all various structures accessible to the visiting public located within the floodplain of Hoover Creek.

Impact Criteria and Methodology

The following issues were identified during internal and public scoping that related to how stream management efforts and the necessary work may affect visitor understanding and appreciation.

- In its current configuration, the stream potentially threatens historic properties and fabric.
- The viewshed between the Birthplace Cottage and the Gravesite must be maintained. The continuation of the eroding stream bed and potential management techniques could affect this viewshed.
- The stabilization of Hoover Creek could create impacts on the natural ambience of the riparian area; it should not look artificial or intrusive and should maximize the use of low-impact and low-maintenance methods.
- Project implementation activities could temporarily affect the visitor experience during project implementation.

The purpose of the impact analysis was to determine if the stream management activities under the action alternatives would be compatible with:

- The desired visitor experience goals, and
- The purpose of the park as identified in the enabling legislation and in other laws and policies affecting visitor use.

To determine the overall effects of the action alternatives on visitor understanding and appreciation, the potential loss of historic resources, preservation of the viewshed, and the potential effect of management activities were evaluated.

For this impact topic, impacts on the resource were determined qualitatively, based on the best professional judgment of NPS staff and consultants. The primary sources of information used in this analysis include existing park management documents, NPS policy documents, and unpublished observations and insights from knowledgeable park staff.

The effects on visitor experience considered changes in opportunities to gain understanding of the life and service of Herbert Hoover, access restrictions, visual intrusions, and noise. Assumptions made regarding how stream management activities might interact with visitor understanding and appreciation include:

- Unless otherwise specified, construction would not preclude visitation to any of the historic resources at the park (except Hoover Creek) during any construction work.
- The necessary construction period associated with any action alternative would not last beyond one summer and autumn.

Definition of Adverse and Beneficial Effects

Adverse effects would diminish the visitor's ability to understand or appreciate one or more aspects of the life and contributions of Herbert Hoover, interrupt the ability to access locations within the project area, or introduce noise and disturbance to the park. Beneficial effects would enhance the visitor's understanding and appreciation, improve accessibility to locations within the park, or reduce noise and/or disturbance in the project area.

Impact Threshold Definitions

The following threshold definitions were developed and applied to determine the intensity of stream management effects on visitor understanding and appreciation.

Negligible: Visitors would not be affected, or changes in visitor understanding and/or appreciation would be below or at the level of detection. The visitor would not likely be aware of the effects associated with the alternative.

Minor: Changes in visitor understanding and/or appreciation would be detectable, although the changes would be slight. Visitors could be aware of effects associated with the alternative, but only slightly.

Moderate: Changes in visitor understanding and/or appreciation would be readily apparent. Visitors would be aware of the effects associated with the alternative and would likely be able to express an opinion about the changes.

Major: Changes in visitor understanding and/or appreciation would be readily apparent and would have important consequences. Visitors would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes. There would be permanent changes to visitor access to resources.

Duration

- Short-term – Effects occur only during the duration of the project.
- Long-term – Effects persist beyond the duration of the project.

Impacts of Alternative A: No Action/Continue Current Management

Management and maintenance of the stream corridor would remain largely unchanged. The park staff would continue to make efforts to prevent the loss of historic and cultural resources, such as waterproofing foundations and maintaining sump pumps and the sewer collection system. However, frequent flooding would still occur, endangering both the historic facilities and interpretive materials contained therein. Over the long term, potential damage to or loss of historic and cultural resources (such as the Birthplace Cottage, Friends Meetinghouse, or Library-Museum), due to frequent or high-intensity flooding, would produce long-term, moderate, localized, adverse effects to visitor understanding and appreciation.

The walking trails, picnic area, and 81-acre tallgrass prairie would continue to provide outdoor recreational opportunities for visitors to enjoy. Picnicking, nature walks, cross-country skiing, and interpretative programs that inform visitors of the influence of the natural environment on the life of Herbert Hoover, as well as festivals and other annual events, would continue to take place. During flood events, visitors would temporarily be denied access to the park, including both buildings and grounds. The restricted access to the park for both local and non-local visitors would continue to result in short-term, moderate, localized, adverse effects to visitor understanding and appreciation.

The effects of frequent flooding would also present the risk of damage to the archival materials housed in the park facilities and the Library-Museum. Though the archives are not property of the NPS, they are an important interpretative focus at the historic site, and the primary resource of the Library-Museum. The potential for damage to or loss of these resources would diminish the visitor experience and attenuate the interpretation of Herbert Hoover's life. This would particularly affect those visitors who come to the park expressly to conduct research. The risk of damage to these archival materials would represent long-term, moderate, localized, adverse effects to visitor understanding and appreciation.

Cumulative Effects. The Prairie Management Plan and Tree Replacement Plan would affect the amount and type of vegetation in and around the Hoover Creek riparian corridor. These actions would enhance the historic setting and provide long-term, negligible to minor, beneficial effects to visitor understanding and appreciation. Cumulatively, vegetation management actions would not offset the adverse effects associated with this alternative, resulting in long-term, moderate, localized, adverse effects to visitor understanding and appreciation.

Conclusion. Long-term, moderate, localized, adverse effects could result from the potential damage to historic structures or materials that have not been protected against flood damage; however, these adverse effects are offset by the continued maintenance of the grounds and facilities through actions such as regularly scheduled landscaping, and maintenance of waterproofed building foundations, sump pumps, and the sewer collection system. This would result in short-term, moderate, localized, adverse effects to visitor understanding and

appreciation, due to the restriction of visitor access to the facilities and grounds during and after occasional flooding.

Impacts of Alternative B: Provide 10-Year Flood Protection

Channel improvements would achieve approximately 10-year flood protection, stabilize the stream, and restore its quality of function. Specific measures to provide 10-year or greater flood protection would include applying a waterproof coating to the foundation of the Library-Museum. The commemorative view from the Birthplace Cottage to the Gravesite would be protected by preserving the open corridor between the two sites. The added, 10-year protection of these structures and the resources included therein from damage and loss due to flooding, as well as the preservation of the viewshed, would result in long-term, minor, localized, beneficial effects.

Improvements to the stream channel would help restore the stream to a more historic appearance and could enhance visitor appreciation of the cultural landscape, resulting in long-term, negligible to minor, parkwide, beneficial effects to visitor understanding and appreciation.

Excavation of the stream channel would facilitate rehabilitation of the historic retaining wall upstream of the Downey Street Bridge. This work, as well as future vegetation management in the immediate area, would protect the historic fabric and would create long-term, negligible to minor, localized, beneficial effects to visitor understanding and appreciation.

The Visitor Center and maintenance facility would receive no added protective measures beyond the channel reconfiguration and vegetation clearing being done in this and other units. The Visitor Center is considered protected, because the first floor elevation matches the 10-year level. However, long-term, moderate, localized, adverse effects due to flood events exceeding the 10-year intensity would still occur, due to backup effects from Wapsinonoc Creek. As the maintenance facility is normally outside the visitor experience, effects to visitor understanding and appreciation would be negligible; however, negligible, adverse effects to visitor understanding and appreciation would be indirectly felt elsewhere due to the effects of flooding on park operations and maintenance.

Ongoing, long-term maintenance and management of walking trails, picnic area, and the 81-acre tallgrass prairie would not change from those described in Alternative A. These resources would continue to provide long-term outdoor recreational opportunities visitors to enjoy.

The historic and cultural features of the park would be open to the public throughout project implementation. However, construction activities to improve the stream channel would impact the of the visitor experience of the stream and northwest portion of the park for approximately one summer and autumn. Construction activities would require visitor restrictions in the vicinity of the stream corridor for the duration of the project. The construction would create noise, temporarily restrict access to some segments of the creek and its banks, and displace vegetation; and therefore produce short-term, minor, localized, adverse effects.

Cumulative Effects. The effects of other projects and plans would be the same as described for Alternative A. Combined with the effects of Alternative B, cumulative effects to visitor understanding and appreciation would be long-term, minor, localized, and beneficial.

Conclusion. Alternative B would result in long-term, negligible to minor, parkwide, beneficial effects from enhanced appreciation of the cultural landscape. The actions providing 10-year flood event protection of the park's structures and their interpretive resources, and preservation of the viewshed between the Birthplace Cottage and Gravesite would result in long-term, minor, localized, beneficial effects. However, the risk of loss of resources in events exceeding 10-year event represents a long-term, moderate, localized, adverse effect. Rehabilitation of the historic retaining wall at the Downey Street Bridge would protect the historic fabric and create long-term, negligible to minor, localized, beneficial effects. The negative effects to visitor experience and access that would be related to various construction activities and the installation of an engineered grade control structure would produce short-term, minor, localized, adverse effects.

Impacts of Alternative C: Provide 15-Year Flood Protection

The adverse and beneficial effects of channel reconfiguration, bank stabilization, remeandering, rehabilitation of the historic wall, and application of foundation waterproofing would be similar to those listed for Alternative B. The rehabilitated stream channel would maintain the view from the Birthplace Cottage to the Gravesite. The actions taken to achieve 10-year flood protection for the Library-Museum and Friends Meetinghouse would be the same as Alternative B, but waterproofing would be added to the foundation of Scellar's Barn and flood shields would be added to the Visitor Center and maintenance facility. The new door shields would be architecturally compatible and unobtrusive to visitors, but preserve the Visitor Center and its function to serve visitors. Following flood events, the damage sustained to this facility would be greatly decreased. This would create long-term, minor, localized, beneficial effects to visitor understanding and appreciation; however, there would still be long-term, minor to moderate, localized, adverse effects resulting from floods exceeding 15 years, due to the backwater effects from flooding of the west branch of Wapsinonoc Creek.

Indirect, adverse effects to visitor understanding and appreciation due to flooding at the maintenance facility would be the same as outlined in Alternative B, except that negligible, beneficial effects would be realized for the 15-year event.

As described for Alternative B, the historic and cultural features of the park would remain open during project implementation. Construction activities related to channel improvements would produce short-term, minor, localized, adverse effects resulting from access restriction and disturbance along the stream an in the park's northwest section.

Most visitor activities would continue to be available. Walking trails, picnic areas, and the 81-acre tallgrass prairie would continue to provide outdoor recreational opportunities for visitors to enjoy.

Cumulative Effects. The effects of other projects and plans would be the same as described for Alternative A. Combined with the effects of Alternative C, cumulative effects to visitor appreciation and understanding would be long-term, moderate, and beneficial.

Cumulative effects of the Prairie Management Plan and Tree Replacement Plan would be similar to those of Alternative B; however, when combined with the benefits of Alternative C, the cumulative effects would be long-term, moderate, localized, and beneficial.

Conclusion. The actions providing channel stabilization, 10-year protection of the Library-Museum and Friends Meetinghouse and their interpretive resources, and preservation of the viewshed between the Birthplace Cottage and Gravesite would result in long-term, minor to moderate, localized, beneficial effects. The increased protection from waterproofing the foundation of Scellar's Barn and the addition of waterproof shields on the Visitor Center would create long-term, minor, localized, beneficial effects to visitor understanding, though the temporary access restrictions during construction activities would cause short-term, minor to moderate, localized, adverse effects. Construction of the designed channel and rehabilitation of the historic wall would result in long-term, negligible to minor, localized, beneficial effects to visitor understanding and appreciation. The negative effects of construction-related visitor access restrictions would produce short-term, minor, localized, adverse effects.

Impacts of Alternative D: Provide 25-Year Flood Protection

The adverse and beneficial effects of channel reconfiguration, bank stabilization, remeandering, and rehabilitation of the historic wall would be similar to those listed for Alternative B, but with the added benefits of increased flood protection from infrequent floods of great magnitude with construction of a detention basin upstream to provide 25-year protection. The rehabilitated stream channel would maintain the view from the Birthplace Cottage to the Gravesite. The stream channel improvements and additional flood protection would produce long-term, moderate, localized, beneficial effects.

Excavation of the detention basin in the Prairie Stream Management Unit would restrict visitor access to this location during construction. The basin would be vegetated with native prairie plants and include the installation of four 6-foot diameter culverts. These would be visible to park visitors in this unit. The visual intrusion would somewhat diminish the visitor experience of the tallgrass prairie, and create long-term, negligible, localized, adverse effects. The detention basin would provide additional water storage in flood events and may provide habitat diversity by supporting wetland plant and bird species during times of high flows, which would be an amenity for visitors to enjoy. This would result in short- and long-term, negligible to minor, localized, beneficial effects.

As described for Alternative B, the historic and cultural features of the park would remain open during project implementation. Construction activities related to channel improvements, and construction of the 25-year detention basin would last through one summer and autumn and would cause some temporary access restrictions. Most visitor activities would continue to be available. The construction necessary for project implementation would create short-term, minor to moderate, localized, adverse effects to visitor understanding and appreciation.

Cumulative Effects. Cumulative effects of other projects and plans would be minor, long-term, and beneficial. When combined with the benefits of Alternative D, the cumulative effects would be long-term, moderate, localized, and beneficial.

Conclusion. The channel stabilization actions and flood-protection measures would result in long-term, moderate, localized, beneficial effects to visitor understanding and appreciation,

due to preservation of park structures. The added protection from the detention basin would produce short- and long-term, negligible to minor, localized, beneficial effects to visitor understanding and appreciation. However, the visual intrusion of the associated culverts would present short-term, negligible, localized, adverse effects.

The negative effects of construction-related visitor access restrictions would produce short-term, minor to moderate, localized, adverse effects.

Impacts of Alternative E: Provide 50-Year Flood Protection, the Preferred Alternative

The adverse and beneficial effects of channel reconfiguration, bank stabilization, remeandering, and rehabilitation of the historic wall would be similar to those listed for Alternative B, but with the added benefits of increased flood protection through use of a detention basin upstream, similar to that described in Alternative D. Fifty-year flood protection would be achieved by expanding the detention basin size to 138 acre-feet. The rehabilitated stream channel would maintain the view from the Birthplace Cottage to the Gravesite. These actions would create long-term, moderate, parkwide, beneficial effects to visitor understanding and appreciation.

Construction activities related to these project elements would create disturbance and access restrictions that would have short-term, minor, localized, adverse effects on visitor understanding and appreciation.

The increased protection of historic structures, resources, and stream function would combine to create short- and long-term, minor to moderate, localized, beneficial effects.

The expanded basin would require additional prairie excavation. Adverse effects resulting from construction noise would increase from those described under Alternative D, due to the larger size of the detention basin, and, with the visual intrusions from the four culverts, would create short- and long-term, negligible to minor, localized, adverse effects to visitor understanding and appreciation.

Walking trails, picnic areas, and the 81-acre tallgrass prairie would continue to provide outdoor recreational opportunities for visitors to enjoy. Most of the activities available to visitors would continue to be available.

Short-term adverse effects during project implementation would be the same as those described for Alternative D.

Cumulative Effects. Cumulative effects of other projects and plans would be minor, long-term, and beneficial. When combined with the long-term, moderate benefits of Alternative E, the cumulative effects would be long-term, moderate, localized, and beneficial.

Conclusion. The channel reconfiguration and flood protection measures would result in long-term, moderate, parkwide, beneficial effects to visitor understanding and appreciation. The negative effects of construction-related visitor access restrictions would be short-term, minor, localized, and adverse. The added protection from flood waters and added, intermittent visitor amenity resulting from the larger detention basin would create short- and long-term, minor to moderate, localized, beneficial effects. However, construction noise and visual intrusions and the presence of large culverts visible from the prairie would create short- and long-term, negligible to minor, localized, adverse effects to visitor understanding and appreciation.

PUBLIC HEALTH AND SAFETY

Guiding Regulations and Policies

Various Federal Laws, Regulations, Executive Orders, policies, and guidelines are applicable to the National Park Service's management of public health and safety. A full list of these regulations can be found in Appendix D.

Methodology and Assumptions

Geographic Area Evaluated for Impacts

The geographic area evaluated for public health and safety included the entire park.

Impact Criteria and Methodology

Issues related to public health and safety identified during public and internal scoping include:

- In its current configuration, the stream potentially threatens human health and safety when flooding occurs.
- The incising stream bed creates a hazard of fall and injury due to its steep six- to eight-feet drop-offs.
- The gradual grading of the stream bed to stabilize the soil could encourage people to approach the water. Water quality in the stream is not safe for human contact because of bacterial contamination.

For public health and safety, impacts on the resource were evaluated and determined qualitatively based on the best professional judgment of NPS staff and consultants. The primary sources of information used in this analysis include existing park management documents, NPS policy documents, and unpublished observations and insights from knowledgeable park staff.

Definitions of Adverse and Beneficial Effects

Adverse effects would increase the potential for accidents or expose park staff and visitors to additional hazards. Beneficial effects would reduce the potential for accidents and limit hazard exposure.

Impact Threshold Definitions

Impact threshold definitions for public health and safety are as follows.

Negligible: Health and safety would not be affected; effects on employee and visitor health or safety would not be appreciable or measurable.

Minor: Effects on employee and/or visitor health and safety would be detectable; however, they would not produce an appreciable change in public health or safety. Mitigation would be relatively simple and likely successful.

Moderate: The effects would be readily apparent, and would result in significant, noticeable effects on employee and/or visitor health and safety on a local scale. Changes in rates or severity of injury could be measured. Mitigation would probably be necessary to offset adverse effects and would likely be successful.

Major: The effects would be swiftly apparent and would result in substantial, noticeable effects on employee and/or visitor health and safety on a regional scale, and could lead to employee or visitor mortality. Extensive mitigation would be needed to offset adverse effects, and its success would not be assured.

Duration

- Short-term – Effects occur only during the duration of the project.
- Long-term – Effects persist beyond the duration of the project.

Impairment

Public health and safety is not considered a resource for which the park was established to protect. Therefore, impairment findings are not included in the analysis for this impact topic.

Impacts of Alternative A: No Action/Continue Current Management

Adverse effects to public health and safety would continue to occur when park staff or visitors venture too close to Hoover Creek and slip or fall. The steep, six- to eight-foot high, undercut and unstable stream banks makes many sections unsafe for foot traffic. Although park staff are exposed to a certain degree of hazard during landscaping and maintenance activities, this issue does not present a public danger and does not affect public health and safety. Additional adverse effects would occur when maintenance workers enter the Hoover Creek channel to clear debris and dense vegetation. These activities would result in long-term, minor, parkwide, adverse effects to public health and safety.

Likewise, short-term, negligible, parkwide, adverse effects to park staff would occur when park staff relocate park resources, equipment, and supplies to protect them from the effects of flooding, because these additional activities add to the risk associated with normal operation of equipment and movement of supplies.

Because of high fecal coliform and *E. coli* contamination in the stream, there are also safety concerns related to contacting stream water or flood flows. The stream's current bank instability makes contact unlikely, except during flood events. During these times, ponded water in the park may also contain storm water contaminants and septic system leachate. Exposure to these components of floodwaters would produce short-term, negligible to minor, parkwide, adverse effects on public health and safety.

Cumulative Effects. Construction of the new maintenance facility outside an area highly prone to flooding would provide long-term, negligible, beneficial effects to health and safety by reducing the need for park staff to remove and replace equipment and supplies during flood events. Implementation of the new flood emergency plan would help ensure the health and safety of visitors and staff during flood events, creating long-term, negligible, beneficial effects. The long- and short-term, minor, adverse effects on safety present under current management would not be addressed, and would offset the beneficial effects of the other plans, producing long-term, negligible to minor, localized, adverse cumulative effects.

Conclusion. There would be long-term, minor, parkwide, adverse effects to public health and safety. These effects would be due to the slip and fall hazard along the creek, hazard of performing maintenance within the stream channel, and possible exposure to contaminated stream or flood waters. Additional short-term, negligible, parkwide, adverse effects would occur when park staff relocate equipment and supplies during flood events, as these activities create additional risk beyond normal working activities.

Impacts of Alternative B: Provide 10-Year Flood Protection

Implementation would result in localized benefits to public health and safety. Reconfiguration and grading of the channel and remeandering of Hoover Creek would produce long-term, minor, parkwide, beneficial effects to public health and safety because a more gradual stream bank grade would reduce the risk of fall hazards for both park staff and visitors. Revegetation of disturbed areas with low maintenance vegetation would result in long-term, negligible, parkwide, beneficial effects for park staff because they would be less exposed to the hazards related to landscaping activities.

Flood recurrence would be marginally reduced, but the need for evacuation of the maintenance facility would not be deceased. Effects to staff health and safety related to flood response would be the same as Alternative A.

The sloping sides of the new stream channel would make the stream bed easier to access, and could increase public exposure to contamination. However, the stream channel is not designed to encourage entry or play in the stream, and little increase in public exposure is anticipated. The reduction in slope and increased vegetation would enhance egress from the stream. Flood waters would exceed the channel during events in excess of the 5-year flow, and could provide short-term opportunity for exposure to contaminants. Overall these hazards present a long-term, minor, parkwide, adverse effect on public health and safety.

Construction activities would produce low levels of risk to visitors and staff during project implementation. The use of construction equipment, increased truck traffic, and contact with stream water by workers could present potential hazards. Risks would be reduced by providing information to visitors and workers on stream management actions, implementing a contractor safety plan, using barriers around the construction units, controlling traffic, and increasing ranger presence. These measures would be taken in all action alternatives. Overall, project implementation and construction would produce short-term, minor, localized, adverse effects on public health and safety.

Cumulative Effects. Effects of other plans and projects on public health and safety are the same as those for Alternative A. The mixed long-term, minor, adverse and long-term, minor, beneficial effects offset one another and would make no contribution to cumulative effects.

Conclusion. There would be long-term, minor, parkwide, beneficial effects by reducing slip and fall hazards along the stream banks. Long-term, minor, parkwide, adverse effects would result from potential exposure to contaminated stream water. Construction activities and relocation of equipment and materials during high flows would produce short-term, localized, adverse effects of negligible intensity.

Impacts of Alternative C: Provide 15-Year Flood Protection

The effects on public health and safety are the same as those for Alternative B.

Cumulative Effects. Cumulative effects would be the same as those for Alternative B.

Conclusion. There would be long-term, minor, parkwide, beneficial effects by reducing slip and fall hazards along the stream banks. Long-term, minor, parkwide, adverse effects would also result from potential exposure to contaminated stream water. Construction activities and relocation of equipment and materials during high flows would produce short-term, localized, adverse effects of negligible intensity.

Impacts of Alternative D: Provide 25-Year Flood Protection

Implementation would include the same channel reconfiguration and remeandering activities and would produce similar localized benefits to public health and safety as in Alternative B. Long-term, minor, parkwide, beneficial effects to public health and safety would occur due to the reduction of fall hazards to visitors and park staff. The beneficial effects of revegetation with low maintenance vegetation would be the same as described in Alternative B.

Short-term, negligible, parkwide, adverse effects to park staff would occur when park staff relocate materials from the maintenance facility during flood events. These additional activities add to the risk associated with normal operation of equipment and movement of supplies. These effects would persist because flooding at this location is largely a result of backwater effects form the west branch of the Wapsinonoc.

Installation of the 67-acre foot detention basin would allow the new channel to convey all flows up the 25-year event. This would somewhat reduce the potential for exposure to contaminated floodwaters. However, access to the stream bed on the slopes of the new channel would be improved. This would result in long-term, negligible, parkwide, adverse effects to health and safety from potential exposure to contaminated water. The risk of exposure to contaminated floodwaters would also potentially be reduced because a decrease in the bacterial count in the stream water may occur as bacteria detained in the basin would be exposed to ultraviolet light and settled out with sediments in the basin.

Construction activities would produce the same temporary, low levels of risk to visitors and staff as outlined for Alternative B, except that the spatial extent would be increased, due to the inclusion of the 67-acre-foot detention area. Project implementation and construction activities would produce short-term, negligible, localized, adverse effects on public health and safety, once mitigated measures would be implemented.

Cumulative Effects. Cumulative effects would be similar to those described under Alternatives B and C.

Conclusion. There would be long-term, minor, parkwide, beneficial effects by reducing slip and fall hazards. Emergency response to flooding would produce short-term, negligible, parkwide, adverse effects to public health and safety as equipment and materials are relocated. The potential for exposure to microbial contaminants in stream water would result in long-term, negligible, parkwide, adverse effects. Construction activities during project implementation would produce short-term, negligible, localized, adverse effects.

Impacts of Alternative E: Provide 50-Year Flood Protection, the Preferred Alternative

The effects on public health and safety would be the same as those in Alternative D.

Cumulative Effects. Cumulative effects would be the same as those in Alternative D.

Conclusion. There would be long-term, minor, parkwide, beneficial effects by reducing slip and fall hazards. Emergency response to flooding would produce short-term, negligible, parkwide, adverse effects to public health and safety as equipment and materials are relocated. The potential for exposure to microbial contaminants in stream water would result in long-term, negligible, parkwide, adverse effects. Construction activities during project implementation would produce short-term, negligible, localized, adverse effects.

PARK OPERATIONS

Guiding Regulations and Policies

Various Federal Laws, Regulations, Executive Orders, policies, and guidelines are applicable to the National Park Service's management of park operations. A full list of these regulations can be found in Appendix D.

Methodology and Assumptions

Geographic Area Evaluated for Impacts

Effects on park management and operations were considered within the boundaries of the park.

Impact Criteria and Methodology

The following issues were identified through public and internal scoping:

- The stream frequently inundates park infrastructure (e.g., maintenance facility), causing disruptions in park operations.
- The stabilization of Hoover Creek should maximize the use of low-impact and low maintenance methods.

For this impact topic, impacts on the resource were evaluated and determined qualitatively, based on the best professional judgment of NPS staff and consultants. The primary sources of information used in this analysis include existing park management documents, NPS policy documents, and unpublished observations and insights from knowledgeable park staff.

Definition of Adverse and Beneficial Effects

Adverse effects would create additional disruptions to park operations, increase stream corridor maintenance, or increase workload caused by flood events. Beneficial effects would reduce disruptions to park operations, maintain or reduce the need for stream corridor maintenance, or reduce workload caused by flood events.

Impact Threshold Definitions

Impacts were evaluated using these threshold definitions:

Negligible: Park management or operations would not be affected, or effects would be at or below levels of detection and would not have an appreciable effect on park operations.

Minor: Effects would be detectable but would not be of a magnitude that would appreciably change park management or operations. Effects might be noticed by park and partner staff, but probably would not be noted by visitors. If needed to offset adverse effects, mitigation would be relatively simple and would likely be successful.

Moderate: The effects would be readily apparent and would result in a substantial change in park management or operations in a manner noticeable to staff and visitors. Mitigation would probably be necessary to offset adverse effects and would likely be successful.

Major: The effects would be readily apparent and would result in a substantial change in park management or operations in a manner noticeable to staff and visitors as markedly different from existing operations. Extensive mitigation would be needed to offset adverse effects, and success would not be assured.

Duration

- Short-term – Effects occur only during the duration of the project.
- Long-term – Effects persist beyond the duration of the project.

Impairment

Park operations are not considered a resource for which the park was established to protect. Therefore, impairment findings are not included in the analysis for this impact topic.

Impacts of Alternative A: No Action/Continue Current Management

Maintenance and management of the historic structures and the stream corridor would remain unchanged. Ongoing operation and maintenance of waterproofing, sump pumps, and centralized storm sewer collection system to guard against periodic flooding would continue. Grounds maintenance, including mowing and landscaping of the formalized park and viewscape, occasional clearing of vegetation, and other park staff activities related to stream management would continue. The continuation of these activities would result in long-term, negligible, localized, adverse effects to park operations.

Short-term, minor, parkwide, adverse effects to park operations would occur, due to the frequent flood events in the park would continue, as staff and materials would be required to mitigate these periodic events. These activities include the short-term park operations tasks associated with both imminent flooding and post flood mitigation.

Cumulative Effects. Implementation of the fire, prairie, and flood emergency plans would include minor increases in park operations tasks without a corresponding increase in available resources. This would include increased maintenance and vegetation management related to the stewardship of the tallgrass prairie, landscape and viewscape, and implementation of duties under the prescribed flood response plan. This represents a long-term, negligible, adverse effect to park operations. Development of the new maintenance facility would have long-term, minor, beneficial effects due to relocation of this structure out of the floodplain and cessation of flood mitigation activities. There would be short-term, minor, adverse effects added to those of other plans, resulting in long-term, minor, localized, adverse effects on park operations.

Conclusion. There would be short- and long-term, minor effects to park operations. The continued activities related to the park maintenance facility, resources, and systems would result in long-term, negligible, localized, adverse effects to park operations. The continued need for park staff to conduct emergency response duties and post flood mitigation tasks from frequent flood events would create short-term, minor, parkwide, adverse effects on park operations.

Impacts of Alternative B: Provide 10-Year Flood Protection

Ongoing standard maintenance operations as described in Alternative A would continue, and the adverse effects to park operations resulting from these tasks would be the same as those listed under Alternative A. There would be improvements to the existing Hoover Creek stream channel; it would be remeandered, and the tributaries would be reconfigured to accommodate peak flows. The Library-Museum foundation would receive waterproofing. Long-term, minor, parkwide, beneficial effects to park operations would be realized in that park staff duties in preparation of and response to flood events less than a 10-year magnitude would not be necessary. However, these tasks would still be necessary for floods exceeding the 10-year flood frequency.

The newly constructed stream channel and banks and other disturbed areas would be reclaimed with low maintenance plant species to blend with the surrounding landscape. The decreased need for mowing of vegetation along the stream channel and removal of dense vegetation from the channel would have long-term, negligible, parkwide, beneficial effects to park operations. Channel maintenance activities would be limited to sediment and debris removal and revegetation after 10-year flood events. Vegetation removal to maintain the historic fabric of the retaining wall at the Downey Street Bridge and periodic monitoring and maintenance of the waterproofing of the Library-Museum foundation would be performed on an ongoing basis and result in long-term, negligible, localized, adverse effects to park operations.

The new oil-water separators or small detention ponds would be installed and maintained by outside contractors and have no effects on park operations.

The park would remain open and available for use during construction activities and would result in short-term, minor, localized, adverse effects to park operations. This would be a result of the added need for park staff to monitor construction activities and ensure protection of park resources.

Cumulative Effects. The cumulative effects of other park projects and plans would be as in Alternative A. Implementation of Alternative B would contribute long-term, negligible to minor, beneficial effects and long-term, negligible, adverse effects to the effects of other projects, resulting in long-term, negligible, localized, beneficial cumulative effects on park operations.

Conclusion. There would be long-term, minor, parkwide, beneficial effects to park operations by providing 10-year flood protection thereby reducing operations in response to floods less than 10-year occurrence and by reducing mowing and vegetation and debris removal in the revitalized stream channel corridor. Improvements to vegetation in the stream channel would create long-term, negligible, localized, beneficial effects to park operations, but maintenance of the channel improvements and waterproofing would present long-term, localized, negligible, adverse effects. There would also be short-term, minor, localized, adverse effects to park operations, due to management of the park during construction activities.

Impacts of Alternative C: Provide 15-Year Flood Protection

The effects of ongoing maintenance activities and the effects of modifications to the stream channel would be the same as in Alternative B. Long-term, minor, parkwide, beneficial effects to park operations would be realized because park staff would not need to prepare or mitigate for flood events less than that of a 15-year event. However, for floods exceeding the 15-year intensity, flood response and mitigation activities would still be necessary. The placement/removal of waterproof door shields at the Visitor Center and maintenance building would reduce the amount of post flood damage mitigation in these facilities and present short-term, negligible, localized, beneficial effects to park operations.

In addition to the waterproofing described in Alternative B, waterproofing materials would be added to the foundations of Scellar's Barn and the maintenance facility. The beneficial effects resulting from improvements to vegetation in the stream channel, as well as the adverse effects of maintaining the channel improvements and waterproofing on structure foundations, would be the same as described for Alternative B.

The same short-term, minor, localized, adverse effects of construction related activities would be the same as outlined in Alternative B.

Cumulative Effects. The effects of other park projects and plans would be as described for Alternative A. Implementation of Alternative C would contribute long-term, negligible to minor, beneficial effects and long-term, negligible, adverse effects. The cumulative effects, combined with the effects of other plans, would be long-term, negligible, localized, and beneficial.

Conclusion. There would be the same long-term, minor, parkwide and localized, beneficial effects on park operations as in Alternative B, with the added benefits of not needing to prepare or mitigate for 15-year flood events and having the protection of waterproofing and waterproof doors on some buildings. Adverse effects of maintaining the waterproofing would be long-term, negligible, and localized. Short-term effects on park operations related to construction activities would be the same as in Alternative B.

Impacts of Alternative D: Provide 25-Year Flood Protection

The effects on park operations would be similar to those outlined for Alternative C. Additional operation and maintenance activities would be associated with the culverts and spillway for the 67-acre-foot detention area, and this would add long-term, negligible, localized, adverse effects to park operations. Flood protection would be increased to handle a 25-year event, but floods exceeding the 25-year flood frequency would still require flood preparation and mitigation activities. This added protection from more severe flooding would create long-term, moderate, parkwide, beneficial effects to park operations.

As in Alternative B, the planting of low maintenance plants, including native species, along the new stream channel would produce long-term, negligible, parkwide, beneficial effects to park operations in that less vegetation removal would be required. Likewise, the new channel configuration would remove the need for sediment and debris removal and revegetation activities for flood events less than 25 years.

The short-term, minor, localized, adverse effects of construction related activities would be the same as those outlined in Alternative B.

Cumulative Effects. The effects of other park projects and plans would be as described for Alternative A. Implementation of Alternative D would contribute long-term, negligible to moderate, beneficial effects and long-term, negligible, adverse effects. The cumulative effects, combined with the effects of other plans, would be long-term, negligible, localized, and beneficial.

Conclusion. Effects would be similar to those described for Alternative B, with the additional benefits of protecting against 25-year flood events, foundation waterproofing, and waterproof doors. This added protection would create long-term, moderate, parkwide, beneficial effects for park operations. Additional operation and maintenance activities associated with the culverts and spillway for the 67-acre-foot detention area would add long-term, negligible, localized, adverse effects. Adverse effects of maintaining the waterproofing, and short-term effects related to construction activities, would be the same as Alternative B.

Impacts of Alternative E: Provide 50-Year Flood Protection, the Preferred Alternative

The effects on park operations due to ongoing park operations and modifications to Hoover Creek's channel would be similar to Alternative B, with the addition of a 138-acre-foot detention basin. Installation of waterproof door shields at the Visitor Center would have little effect on park operations. The capacity of this basin would greatly decrease the need for park staff to prepare for and mitigate the effects of floods, resulting in long-term, moderate, parkwide, beneficial effects to park operations. For rare floods exceeding the 50-year flood frequency, flood response and mitigation activities would be required, and adverse effects would occur.

As in Alternative B, the planting of low maintenance cover to blend with the surrounding landscape would produce long-term, negligible, parkwide, beneficial effects to park operations in that less maintenance would be required. Likewise, the new channel configuration would require sediment and debris removal and revegetation activities only for flood events greater than 50-year events.

As in Alternative D, additional operation and maintenance activities would be associated with the culverts and spillway for the detention basin, creating long-term, negligible, localized, adverse effects on park operations.

The short-term, minor, localized, adverse effects of construction related activities would be the same as outlined in Alternative B.

Cumulative Effects. Effects of other park projects and plans would be as described for Alternative A. Implementation of Alternative E would contribute long-term, negligible to moderate, beneficial effects and long-term, negligible, adverse effects to park operations. These cumulative effects, combined with the effects of other plans, would be long-term, negligible, localized, and beneficial.

Conclusion. Effects would be similar to those in Alternative B, with the additional benefits of protecting against 50-year flood events, by adding a 138-acre-foot detention basin. This added protection would create long-term, moderate, parkwide, beneficial effects for park operations, due to the decreased preparation and mitigation activities related to flood events. Additional operation and maintenance activities associated with the culverts and spillway for the 138-acre-foot detention area would add long-term, negligible, localized, adverse effects. Short-term effects related to construction activities would be the same as in Alternative B.

SOILS

Guiding Regulations and Policies

Various Federal Laws, Regulations, Executive Orders, policies, and guidelines are applicable to the National Park Service's management of soils. A full list of these regulations can be found in Appendix D.

Methodology and Assumptions

Geographic Area Evaluated for Impacts

The area analyzed for possible impacts on soils is contained in the riparian corridor and floodplain of Hoover Creek, with a buffer unit of 100 feet from the centerline of both sides of the creek extending from the park's east boundary to the west boundary.

Impact Criteria and Methodology

The following issue was identified through public and internal scoping:

- The incising stream bed is leading to the loss of vegetation and soil that supports wildlife and anchors the riparian area.

Information on soils and response of soils to various impacts was compiled from the Natural Resource Conservation Service soil survey for Cedar County, Iowa, other agency maps, and documentation, relevant literature, and resource experts. General soil types, erosion potential, structure, and function were discussed, and impacts of each alternative were analyzed, based on reference information, anticipated effects of management prescriptions by alternative, and professional judgment.

Definition of Adverse and Beneficial Effects

Adverse effects to soils would reduce productivity, increase erodibility, or otherwise diminish the natural ability of soils to support vegetation. Beneficial effects would increase productivity, reduce erodibility, or otherwise enhance the ability of soils to support vegetation.

Impact Threshold Definitions

Impacts were evaluated using these threshold definitions:

Negligible: Soils would not be affected, or the effects on soils would be below or at levels of detection. There would be no discernable effect on the rate of soil erosion and/or the ability of the soil to support native vegetation.

Minor: The effects on soils would be detectable, but effects on soil productivity or fertility would be small. There would be localized, detectable effects on the rate of soil erosion and/or the ability of the soil to support native vegetation. If mitigation was needed to offset adverse effects, it would be relatively simple to implement and would likely be successful.

Moderate: The effect on soil productivity or fertility would be readily apparent and would result in a change to the soil character over a relatively wide area. The rate of soil erosion and/or the ability of the soil to support vegetation would be appreciably changed. Mitigation would probably be necessary to offset adverse effects and would likely be successful.

Major: The effect on soil productivity or fertility would be readily apparent and would substantially change the character of the soils over a large area in the park. The actions would have substantial, highly noticeable influence on the rate of soil erosion and/or the ability of the soil to support vegetation. Mitigation measures to offset adverse effects would be needed, and their success would not be assured.

Duration

- Short-term – Upon project completion, recovery would take less than two years.
- Long-term – Upon project completion, recovery would take more than two years.

Impairment

Impairment to soil resources would occur when chemical, physical, or biological changes to soils would be widespread, readily measurable, and would be substantially and frequently altered from the existing soil conditions. In addition, the adverse effects to the park's soil resources and values would:

- Contribute to the deterioration of the soil resources and values to the extent that the purpose of the park would not be fulfilled as established in its enabling legislation.
- Contribute to the deterioration of the soil essential to maintaining the natural and cultural integrity or opportunities for enjoyment in the various park resources.

Impacts of Alternative A: No Action/Continue Current Management

Long-term, minor, localized, adverse effects of soil resources would continue. These effects would result from the continued rapid downward incision and meandering of Hoover Creek.

These processes would continue to create steep, severely eroded, unstable banks that continually slump into the stream bed, where soil is carried away and deposited further downstream. Under conditions of increased flow or flooding, these conditions would be exacerbated and result in flood-laid deposits of mud, silts, and sand that would later need to be removed in the channel, from manicured and landscaped areas, and hard surfaces.

The continued use of maintenance equipment such as tractors, mowers, or trucks can lead to short-term, negligible, localized, adverse effects on soils due to soil compaction. This would occur during park operations and the staging of such activities, both on and off park roadways and trails for repairs of trails, bridges, buildings, and other park infrastructure and landscaping, mowing, and weed control.

Cumulative Effects. Continuing current management would contribute adverse effects to soil resources. Implementation of the Prairie Management Plan and Fire Management Plan would result in long-term, negligible, beneficial impacts on soil resources because natural soil processes and formation would be enhanced through improved management of the tallgrass prairie. Implementation of the Tree Replacement Plan and potential development of a new maintenance facility at Thompson Farm would have short- and long-term, negligible, adverse effects on soil resources. Effects of Alternative A, in combination with the beneficial effects of other plans and projects, would produce cumulative effects that would be long-term, minor, localized, and adverse.

Conclusion. There would be long-term, minor, localized, adverse effects on soil resources. These effects would be due to the continued rapid downward incision and meandering of Hoover Creek, resulting in stream bank slumping and severe erosion and deposition of flood-laid deposits. The continued use of maintenance equipment can lead to short-term, negligible, localized, adverse effects on soils.

Alternative A would not result in impairment of soil resources or values in the park.

Impacts of Alternative B: Provide 10-Year Flood Protection

The new channel components and structures would produce a stabilized stream channel that would have an established course that has a low sensitivity to disturbance and very good recovery potential when disturbed. This would produce long-term, minor, localized, beneficial effects on soil resources, in that the stream processes of meandering and point bar development would be re-established and maintained. This would reduce the rate of soil erosion and down-cutting and help to maintain a stable community of riparian vegetation and aquatic plants and animals.

The new channel banks and reclaimed former channel areas would be covered with low, tough groundcover to blend with the adjacent landscape. This vegetative cover would provide long-term, minor, localized, beneficial effects to soil resources, because the vegetation would provide roughness and flow resistance to help retain bank stability and slow flows, reducing soil erosion and establishing an erosion/deposition balance. Further enhancement of these beneficial effects would be realized through additional bank reinforcements located at sharper meander turns. The location, size, and types of these features would be determined during final engineering. In the Village Green and Recreation Stream Management Units, underground oil-water separators or small detention ponds would be installed to improve the quality of storm water entering Hoover Creek from the parking

lots. This would result in long-term, negligible, localized, adverse effects on the underlying soil during and after the construction phase due to the use of this structure and impervious nature of its surface/liner. Short-term, negligible, localized, adverse soil disturbances would occur at the Library-Museum where an impervious waterproof coating would be applied to their foundations.

Excavated soil would have multiple uses. Possible uses would be evaluated to assess any cost reductions due to sale or reuse of the soil. Some excavated material would be suitable for reclaiming old channel sections or reclamation of channel banks. Soil not reused on-site would be stockpiled and be reused off-site. Soils slated for off-site use would have long-term, negligible, localized, adverse effects to soil resources because some soils would be removed from the park. Effects of on-site reuse of soil would be short-term, moderate, localized, and adverse during excavation and rehabilitation.

Over the long term, the 4.5 acres of disturbance resulting from construction would have no adverse effects, due to mitigation measures and restoration procedures. Construction would create short-term, moderate, localized, adverse effects on soil resources. These effects would be limited to acreage within the channel and construction area. Temporary parking for construction workers and staging areas for equipment and supplies would be necessary for the duration of the project and would have potential short-term, negligible, localized, adverse effects in designated areas. The disturbed areas would be reclaimed, and replanted to match the surrounding landscape.

Cumulative Effects. Implementation would be beneficial to soil resources. The Prairie Management Plan and Fire Management Plan would result in long-term, negligible, beneficial impacts on soil resources due to benefits derived from a thriving groundcover. Implementation of the Tree Replacement Plan and development of a new maintenance facility would have short- and long-term, negligible, adverse effects on soil resources. Effects of Alternative B would contribute to the long-term, negligible, beneficial effects of the other plans and projects, to produce cumulative effects that would be long-term, minor, localized, and beneficial.

Conclusion. There would be long-term, minor, localized, beneficial effects on soil resources. These effects would result from the stabilization gained from new channel components and structures that would reestablish and maintain stream processes, reducing the rate of erosion, down-cutting, and sedimentation due to flooding. Long-term, negligible, localized, adverse effects would result from the installation of impervious oil-water separators or detention ponds. Removal of some soils, resulting from excavation work, would produce long-term, negligible, localized, adverse effects. Construction activities would have short-term, moderate, localized, adverse effects on soil resources.

Alternative B would not result in impairment of soil resources or values.

Impacts of Alternative C: Provide 15-Year Flood Protection

The effects on soil resources would be the same as for Alternative B. The only change would be that the Visitor Center and maintenance facility would undergo additional water proofing.

As in Alternative B, there would be the same long-term, minor, localized, beneficial effects on soil resources resulting from the reestablishment and maintenance of stream processes and reduced erosion.

As in Alternative B, installation of storm water management measures would result in long-term, negligible, localized, adverse effects on the underlying soils.

Similar to Alternative B, construction and construction-related disturbances would have the same short-term, moderate, localized, adverse effects on soil resources. However, these effects would be slightly intensified, due to the addition of water proofing to the foundations of two more buildings. Disturbed areas would be reclaimed, and replanted with tough, low-growing vegetation to blend with the surrounding landscape.

Excavated soil would be suitable for reclaiming the old channel and some would be stockpiled and be reused off-site. Soils slated for off-site use would have a long-term, negligible, localized, adverse effect because some soils would be permanently removed from the park. On-site reuse would result in short-term, moderate, localized, adverse effects during project implementation, but would have no future effect once mitigation and restoration procedures were complete.

Cumulative Effects. The cumulative effects on soils would be the same as in Alternative B.

Conclusion. There would be the same long-term, minor, localized, beneficial effects on soil resources as outlined for Alternative B. Construction would have similar short-term, moderate, localized, adverse effects as described for Alternative B.

Alternative C would not result in impairment of soil resources or values.

Impacts of Alternative D: Provide 25-Year Flood Protection

Changes to Hoover Creek's channel configuration, remeandering, and installation of a grade control structure would be the same as for Alternatives B and C, except that a 67-acre-foot detention basin would be added in the upstream reaches of Hoover Creek. This basin would serve to slow incoming flows, which would then reduce peak flows through downstream reaches. This would further enhance the long-term, minor, localized, beneficial effects to soil resources realized from channel reconfigurations, remeandering, and installation of a grade control structure, as described in Alternatives B and C. The total acreage of disturbance for this alternative would be approximately 16.5 acres.

The 67-acre-foot detention area would be excavated at the north and west tributary confluence. This would preserve the channels that pass through the detention storage site but require excavation of much of the mound between the creeks, as well as some of the hillside. The maximum depth of excavation would be 8 feet and would expose the underlying loess/clay soils. The total excavation for this option would disturb approximately 12 acres of the prairie's northwest corner. Water would be temporarily detained by an embankment that would be located approximately 300 feet downstream of the confluence.

Construction of the new channel configuration, remeandering, grade control structure, excavation of the 67-acre-foot detention area, and construction of the detention basin would produce short-term, moderate, localized, adverse effects on soil resources. This disturbance would be limited to acreage within the channel and detention area. However, where the increased number of flows or long-term detention of water in the detention area occurs, long-

term changes to soil characteristics may occur over time due to the increase in soil moisture. Changes in soils are natural and would not diminish soil function in supporting vegetation. Temporary parking for construction workers and staging areas for construction equipment and supplies would be reclaimed and replanted to match the surrounding landscape.

Long-term, negligible, localized, adverse effects would occur during placement of the oil-water separators or detention ponds in the Village Green and Recreation Stream Management Units.

The total excavation of soil in this alternative is about 78,000 cubic yards. In the event that all topsoil is removed and underlying soil layers exposed, excavated topsoil would be banked. At least 2 feet of topsoil would be replaced to ensure support of a vegetative community and to protect groundwater resources. Excavated soil would have multiple uses, including reclamation of old channel sections or construction of the 67-acre-foot detention embankment. Soil not reused on-site would be stockpiled for use off-site. Soils slated for off-site use would have long-term, minor to moderate, localized, adverse effects, as they would be removed from the park. Effects of on-site soil reuse would be short-term, moderate, localized, and adverse. No future effects would occur from this or any channel improvement work, once mitigation and reclamation were complete.

Cumulative Effects. Implementation would contribute adverse effects to soil resources. Implementation of the other stabilization and groundcover projects and plans would result in both long-term, negligible, beneficial impacts and short- and long-term, negligible, adverse effects on soil resources. The beneficial effects of Alternative D would be somewhat offset by the adverse effects resulting from permanent soil loss, and thereby contribute to create long-term, moderate, localized, adverse cumulative effects on soil resources.

Conclusion. There would be the same long-term, minor, localized, beneficial effects on soil resources as in Alternatives B and C. Installation of oil-water separators or small detention ponds would result in long-term, negligible, localized, adverse effects on the underlying soil during and after installation. Construction would have short-term, moderate, localized, adverse effects on soil resources, while banking, reuse, and other disturbance of soil would produce a long-term, minor to moderate, localized, adverse effect. Permanent loss of soils for off-site use would have long-term, minor to moderate, localized, adverse effects on soil resources.

Alternative D would not result in impairment of soil resources or values.

Impacts of Alternative E: Provide 50-Year Flood Protection, the Preferred Alternative

Changes to Hoover Creek's channel configuration and remeandering would be the same as for Alternative D, except that a 138-acre-foot detention basin extending south another 180 feet would be in place of the 67-acre-foot detention area. This would further enhance the long-term, minor, localized, beneficial effects to soil resources realized from the channel reconfigurations, remeandering, and grade control structure described in Alternative B. The total acreage of disturbance anticipated under this alternative would be about 18.5 acres.

The 138-acre-foot detention area would be excavated in the same area described for the 67-acre-foot detention area. This would provide much more efficient attenuation of incoming peak flows, thus augmenting the beneficial effects on soils realized for the channel

improvements. Soils from additional acreage in the prairie to the south of the stream would be removed.

The flow rates from the storage basin into the creek channel would be sufficiently reduced so that no additional building-specific protection measures that would generate soil disturbance would be necessary. As in Alternative B, installation of underground oil-water separators or small detention ponds would result in long-term, negligible, localized, adverse effects on the underlying soil during and after installation.

Construction of the new channel configuration, remeandering, installation of a grade control structure, excavation of the 138-acre-foot detention area, and placement of the detention embankment would be similar to the short-term, moderate, localized, adverse effects on soil resources mentioned in Alternative B. However, where the increased number of flows or long-term detention of water in the detention area occurs, long-term changes to soil characteristics may occur over time due to the increase in soil moisture; however, this would not diminish soil function in supporting vegetation. The effects of disturbance related to parking and staging of supplies and equipment would also be the same as described for the other action alternatives.

The total excavation of soil in this alternative is about 175,000 cubic yards. The effects on soils from excavation, topsoil banking, reuse, and potential permanent loss would be the same as those described for Alternative D.

Cumulative Effects. Implementation would contribute adverse effects to soil resources. Implementation of the other stabilization and groundcover plans and projects would result in both long-term, negligible, beneficial impacts and short- and long-term, negligible, adverse effects. Considered together, the effects of Alternative E would be somewhat offset by the long-term, minor to moderate, adverse effects resulting from permanent soil loss, and in combination with the other projects to create long-term, moderate, localized, adverse cumulative effects on soil resources.

Conclusion. There would be the same long-term, minor, localized, beneficial effects on soil resources as outlined for Alternative B. Installation of storm water management measures would result in long-term, negligible, localized, adverse effects on the underlying soil during and after installation. Construction would have short-term, moderate, localized, adverse effects on soil resources in the park, while banking, reuse, and the potential for permanent loss of soil would produce long-term, minor to moderate, localized and localized, adverse effects.

Alternative E would not result in impairment of soil resources or values.

VEGETATION

Guiding Regulations and Policies

Various Federal Laws, Regulations, Executive Orders, policies, and guidelines are applicable to the National Park Service's management of vegetation. A full list of these regulations can be found in Appendix D.

Methodology and Assumptions

Geographic Area Evaluated for Impacts

The area analyzed for possible impacts on vegetation is contained within the riparian corridor and floodplain of Hoover Creek and in a 100-foot buffer unit from the centerline of the creek along both sides extending from the park's east boundary to the west boundary.

Impact Criteria and Methodology

Issues regarding the effects of stream management activities on vegetation and communities contained in the treatment corridor were identified during internal and public scoping meetings. These issues include:

- The incising stream bed is leading to the loss of vegetation that supports wildlife and anchors the riparian area.
- The construction activities during stabilization of the stream bed could destroy existing vegetation.
- Vegetation along the stream corridor should be replaced with a seed mix that will appear natural while still being compatible with the cultural landscape.

Information on vegetation and response of vegetation to various impacts was compiled from relevant literature and resource experts. General vegetation types were discussed and impacts of each alternative were analyzed, based on reference information, anticipated effects of management prescriptions by alternative, and professional judgment.

Definition of Adverse and Beneficial Effects

Adverse effects to vegetation would involve the loss of the existing plant assemblages, including species within the maintained cultural landscape and native plants in the restored prairie. Beneficial effects would include increased vegetative cover on stream banks to improve stability, providing opportunities for increased diversity of native prairie species to develop, and reducing the population of exotic species.

Impact Threshold Definitions

Impacts were evaluated using these threshold definitions:

Negligible: Individual plants may occasionally be affected, but measurable or perceptible changes in plant community size, integrity, or continuity would not occur.

Minor: Effects to plants would be measurable or perceptible, but would be localized within a small area. The natural function and character of the plant community would not be affected.

Moderate: A change would occur in the natural function and character of the plant community in terms of abundance, distribution, quantity, and quality but not to the extent that the basic properties of the community change.

Major: Effects to communities would be readily apparent and would substantially change the natural function and character of the plant types over a large area within the park.

Duration

- Short-term – Upon project completion, recovery would take less than two years.
- Long-term – Upon project completion, recovery would take more than two years.

Impairment

Impairment to the vegetation communities would occur when the action(s) contributes substantially to deterioration of the vegetation in the park to the extent that the vegetation communities would no longer function as natural communities. In addition, the adverse effects to the park's vegetation resources and values would:

- Contribute to the deterioration of the vegetation resources and values to the extent that the purpose of the park would not be fulfilled as established in its enabling legislation.
- Contribute to the deterioration of the vegetation resources essential to the natural and cultural integrity or opportunities for enjoyment in the park.

Impacts of Alternative A: No Action/Continue Current Management

There would be long-term, minor, localized, adverse effects on park vegetation due to disturbances caused by the continued rapid down-cutting of Hoover Creek and resultant slumping of unstable stream banks through lateral migration. These activities damage vegetation through the combined effects of erosion and mass wasting. Disturbance would promote growth of plant species that take advantage of highly disturbed areas. Park staff would continue to monitor for the opportunistic growth of exotic and invasive plants.

Vegetation would continue to undergo disturbance from the ongoing mowing/cutting and general landscaping activities in the highly manicured areas, as well as along the riparian corridor of Hoover Creek. Management actions for the tallgrass prairie would not adversely affect vegetative species, and would continue to have beneficial effects by encouraging growth and maintaining diversity. These vegetation management activities would also take place in all the action alternatives.

Cumulative Effects. Implementation of the prairie and fire management plans, and the Tree Replacement Plan, would result in long-term, negligible to minor, beneficial impacts on vegetation, due to the restoration of natural ecosystem processes. Development of a new maintenance facility would create short- and long-term, negligible, adverse effects. The effects of Alternative A would contribute to these effects to create cumulative effects that would be long-term, negligible, localized, and adverse.

Conclusion. There would be long-term, minor, localized, adverse effects on vegetation within the park. This would result from the continued down-cutting, lateral migration, and slumping stream banks of Hoover Creek. Normal vegetation management activities would not adversely affect park vegetation and in some cases may enhance growth and diversity.

Alternative A would not result in impairment of vegetation resources or values.

Impacts of Alternative B: Provide 10-Year Flood Protection

The existing stream channel would be reconfigured and remeandered to increase capacity and slow the rate of flow, with the added benefits of some site-specific flood protection. In the

Prairie Stream Management Unit, willows and pines in the channel and on the banks would potentially be affected by reconfiguration of the tributaries. The new, stable channel would have long-term, minor, localized, beneficial effects to vegetation resources in the stream corridor because vegetation loss would be reduced.

Channel reconfiguration would create a total disturbance of about 4.5 acres, assuming a 100-foot wide corridor along both sides of the centerline of each stream reach. The steep new banks would be reclaimed. Revegetation would include seeding and mulching with a seed mix that is compatible with the cultural landscape. Where the stream course would be remeandered, several mature trees would be removed, but replaced as appropriate to offset any long-term adverse effects. These actions would allow the reestablishment of riparian vegetative communities and aquatic plants and animals in and along Hoover Creek, and provide long-term, minor, localized, beneficial effects. However, the vegetation damaged or removed during construction and excavation would not fully recover resulting from revegetation efforts for approximately two years, representing short-term, minor, localized, adverse effects.

There would be short-term, minor, localized, adverse effects to vegetation in and adjacent to the stream channel resulting from staging of construction equipment and materials.

Cumulative Effects. Implementation of the other plans and projects would result in beneficial impacts as described in Alternative A. The beneficial effects of Alternative B would contribute to these effects to create long-term, minor, beneficial cumulative effects. Adverse effects from the development of a new maintenance facility would be intensified by the effects of Alternative B to produce short-term, minor, localized, adverse cumulative effects to vegetation.

Conclusion. There would be long-term, minor, localized, beneficial effects on vegetation resulting from the reduced vegetation loss and reestablished riparian vegetative community. Channel rehabilitation construction activities would produce short-term, negligible to minor, localized, adverse effects.

Alternative B would not result in impairment of vegetation resources or values.

Impacts of Alternative C: Provide 15-Year Flood Protection

Impacts on vegetation would be the same as those described for Alternative B.

Cumulative Effects. Cumulative effects would the same as those in Alternative B.

Conclusion. Long- and short-term effects to vegetation would be the same as in Alternative B.

Alternative C would not result in impairment of vegetation resources or values.

Impacts of Alternative D: Provide 25-Year Flood Protection

Long-term, minor, localized, beneficial effects on vegetation resources would occur. Effects from channel improvements and revegetation would be the same as in Alternative B. In addition, excavation of the 67-acre-foot detention basin would provide the opportunity for the park to remove approximately 25 to 30 percent of their exotic plant species. Soils that may potentially include exotic species would be placed in the lower levels of the

embankment, where the exotic species could no longer reproduce, resulting in long-term, minor, localized, beneficial effects.

Construction activities would create a total disturbance of about 16.5 acres. After construction activities were completed, the steep channel banks and reclaimed former channel areas, and other areas disturbed by equipment and traffic would be reclaimed as described in Alternative B. The slopes of the added embankment would be revegetated with appropriate species. Several mature trees would be removed; however, any long-term adverse effects associated with removal would be offset by replanting of trees where appropriate.

Construction of the new stream channel would produce similar short-term adverse effects to vegetation as Alternative B, with additional effects from excavating a detention basin. Vegetation located in the detention basin could change in response to increased levels of soil moisture due to a greater availability of water due to periodic inundations, increasing species diversity by up to 50 percent (Middlemis-Brown pers. comm. 2005).

Adverse effects associated with construction equipment working within the approved work area would be short-term, minor to moderate, and localized, due to the addition of the 67-acre-foot detention basin and associated embankment.

Cumulative Effects. Implementation of Alternative D would contribute to the same cumulative effects as described for other projects in Alternative B, and produce overall cumulative effects that would be long-term, minor, localized, and beneficial.

Conclusion. Long- and short-term effects to vegetation would be the same as in Alternative B. The added opportunity to remove exotic species represents a long-term, minor, localized, beneficial effect to vegetation resources. The adverse effects of construction activities would be greater due to construction of the detention basin and embankment and would be short-term, minor to moderate, and localized.

Alternative D would not result in impairment of vegetation resources or values.

Impacts of Alternative E: Provide 50-Year Flood Protection, the Preferred Alternative

Long-term, minor, localized, beneficial effects on vegetation resources and values would be the same as in Alternative D. Modifications to Hoover Creek's channel configuration and remeandering, and clearing and cleaning of the upper reaches of Hoover Creek would remain, with the addition of a 138-acre-foot detention basin and associated embankment. Beneficial effects of removing exotic species would be similar to those in Alternative D, except to a greater extent, because the larger detention basin would result in approximately 14 acres of disturbance, and would provide increased opportunity for the park to remove exotic plant species.

The same short-term, minor to moderate, localized, adverse effects in and adjacent to the stream channel, detention basin and embankment construction areas would occur as in Alternative D, but would be over a larger area. Vegetation located in the detention basin could change in response to increased levels of soil moisture due to a greater availability of water due to periodic inundations.

After construction activities were complete, reclamation activities in the channel banks, former channel areas, detention basin and embankment, and other areas disturbed by equipment and traffic would be the same as described for Alternative C.

Cumulative Effects. Implementation would contribute to the same cumulative effects of other projects as described for Alternative B, and produce overall cumulative effects that would be long-term, minor, localized, and beneficial.

Conclusion. There would be the same long- and short-term effects on vegetation as in Alternative D, though the detention basin would cover a larger area.

Alternative E would not result in impairment of vegetation resources or values.

WILDLIFE

Guiding Regulations and Policies

Various Federal Laws, Regulations, Executive Orders, policies, and guidelines are applicable to the National Park Service's management of wildlife. A full list of these regulations can be found in Appendix D.

Methodology and Assumptions

Geographic Area Evaluated for Impacts

The area evaluated for impacts to wildlife includes the area within the park boundary, or areas outside the park boundary in which wildlife could be disturbed by the treatment actions. For instance, the noise from construction equipment may disturb wildlife species outside the park. Areas adjacent and contiguous to the park that may provide habitat to wildlife will also be considered for impacts on the reasonable range of the wildlife species.

Impact Criteria and Methodology

Issues related to the presence of wildlife species in the treatment area identified during public and internal scoping include the following:

- The stream does not have a healthy riparian buffer or support native aquatic populations.
- The incising stream bed is leading to loss of vegetation that supports wildlife and anchors the riparian area.
- Construction activities during stabilization of the stream bed could displace wildlife and destroy existing vegetation.
- Stream management activities should consider creating habitat that would foster the increased presence of wildlife in the area.

The potential impacts to wildlife and wildlife habitat were analyzed based on the species present and their association with the area targeted for treatment. Alternative A was used as the baseline management condition against which the other alternatives were compared. The analysis focuses on the effects on wildlife and wildlife habitat that would occur as a result of the implementation of the management actions described in the alternatives. The conclusions reached are supported by research conducted by the U.S. Fish and Wildlife Service, the Iowa Fish and Wildlife Conservation Commission, academia and park staff.

Definition of Adverse and Beneficial Effects

Beneficial effects would result from the maintenance or restoration of native wildlife populations, including their habitat. Adverse effects would involve the loss of native species diversity, supporting habitat, or population numbers.

Impact Threshold Definitions

Impacts were evaluated using these threshold definitions:

Negligible: An action would result in no observable or measurable impacts to native wildlife species, their habitats, or the natural processes sustaining them.

Minor: An action would result in detectable impacts, but they would not be expected to result in substantial population fluctuations and would not be expected to have any measurable long-term effects on native species, their habitats, or the natural processes sustaining them. Occasional responses to disturbance by some individuals could be expected, but without interference to feeding, reproduction, or other factors affecting population levels.

Moderate: An action would result in detectable impacts on native wildlife, their habitats, or the natural processes sustaining them. Key ecosystem processes may experience disruptions that would be outside natural range of fluctuation (but would return to natural conditions). Sufficient habitat would remain functional to maintain viability of native wildlife populations.

Major: An action would result in detectable impacts on native wildlife, their habitats, or the natural processes sustaining them. Key ecosystem processes would be disrupted permanently. Adverse responses to disturbance by some individuals would be expected, with negative impacts to feeding, reproduction or other factors resulting in a long-term decrease in population numbers and genetic variability.

Duration

- Short-term – Recovers in less than one year after project completion.
- Long-term – Takes more than one year to recover after project is complete.

Impairment

Impairment to wildlife resources would occur when the action contributes substantially to deterioration of wildlife resources or their habitat in the park to the extent that the wildlife would no longer survive as a viable population. In addition, the adverse effects to wildlife in the park and critical habitat resources and values would:

- Contribute to the deterioration of the wildlife resources and values to the extent that their integrity or opportunities for enjoyment in the park are lost.

Impacts of Alternative A: No Action/Continue Current Management

Long-term, negligible to minor, localized, adverse effects on wildlife would continue, as continued stream incision and bank slumping would degrade habitat for terrestrial and aquatic wildlife. These effects would occur as soils and vegetation along the banks continue to collapse into the stream bed, delivering sediment, thereby reducing water quality.

The disturbance and potential displacement of small areas of habitat that result from the mowing/cutting of vegetation near the banks, landscape infrastructure, and tallgrass prairie as well as the presence of visitors would be short-lived and generally would not adversely affect wildlife species. Any adverse effects would be reduced during evening and night hours, when human presence and activities would be minimal.

The prairie habitat of the state listed Henslow's sparrow would remain largely unaffected by ongoing stream management activities.

Short-term, negligible, localized, adverse effects to wildlife would be realized through normal, ongoing park maintenance and visitor activities.

Cumulative Effects. Implementation would result in long-term, negligible to minor, adverse effects on wildlife. Implementation of the Prairie Management Plan would provide long-term, minor, beneficial effects, as periodic mowing or burning of the prairie would maintain suitable habitat for many native species, including the state listed species Henslow's sparrow. Short-term, negligible to minor, adverse effects would be incurred during implementation of other park projects, including development of a new maintenance facility. Combined with the effects of other plans, Alternative A would have long-term, negligible to minor, localized, adverse effects on wildlife.

Conclusion. Long-term, negligible to minor, localized, adverse effects on wildlife would continue to occur. These effects would be due to habitat degradation and caused by stream bank slumping and erosion. Short-term, negligible, localized, adverse effects to wildlife would be realized through normal park maintenance and visitor activities.

Alternative A would not result in impairment of wildlife resources or values.

Impacts of Alternative B: Provide 10-Year Flood Protection

The stability of the new channel would produce long-term, negligible to minor, localized, beneficial effects on wildlife because stabilization would reduce the destruction of substrate (soil and vegetation) upon which wildlife depends. The channel improvements would also create stream meanders, a pool/riffle sequence, point bars, and appropriate undercuts that would provide habitat for aquatic species. The resulting stream corridor would enable small mammals, birds, insects, and other wildlife species to re-colonize and use the vegetation for foraging, and the stream as a movement corridor. Several mature trees would be removed, but any long-term, adverse effects would be offset by the stream condition enhancements.

The ongoing disturbance caused by maintenance and visitation would continue to be short-lived, and the intensity, duration, and extent of effects on wildlife would be similar to that outlined in Alternative A.

Short-term effects on wildlife would be minor, localized, and adverse. The effects would result from disturbance and noise related to construction work and the presence of people and machines. Construction generated effects would persist during daylight hours for the duration of the project. Most of the species in the stream corridor would relocate, either within or adjacent to the park during project construction. Temporary destruction of riparian aquatic and burrowing habitats would occur during construction activities. This would lead to some wildlife mortality, especially for burrowing mammals, reptiles, and amphibians. Although individuals may perish, the adverse effect on populations would be considered short-term,

negligible to minor, and localized, because other locations are available for use and the stream corridor will be re-colonized after the project is complete.

The prairie habitat would not be directly affected. However, noise and disturbance may cause some species to relocate during the daylight construction hours.

Cumulative Effects. There would be long-term, negligible to minor, beneficial effects to wildlife. Effects of other plans and projects would be similar to those described for Alternative A. Cumulatively, there would be long-term, negligible, localized, beneficial effects to wildlife.

Conclusion. Long-term, negligible to minor, localized, beneficial effects on wildlife would occur due to stabilization of the stream channel, which reduces the destruction of substrate and creates pools that provide habitat for aquatic species. Short-term disturbances to wildlife resulting from park maintenance and visitation would continue as described in Alternative A. Short-term, minor, localized, adverse effects on wildlife would be realized during stream channel rehabilitation construction activities.

Alternative B would not result in impairment of wildlife resources or values.

Impacts of Alternative C: Provide 15-Year Flood Protection

The long-term beneficial and short-term adverse effects on wildlife resources would be the same as for Alternative B and there would be the same long-term, negligible to minor, localized, beneficial effects on wildlife in the riparian corridor because the stream processes of meandering and point bar development would be re-established and reduce the rate of wildlife habitat loss from erosion of unstable stream banks. Short-term, minor, localized, adverse effects would result from the construction activities related to channel improvements and flood proofing.

Cumulative Effects. There would be long-term, negligible to minor, beneficial effects to wildlife. Effects of other plans and projects would be the same as those described for Alternative B. Cumulatively, there would be long-term, negligible, localized, beneficial effects to wildlife.

Conclusion. Long-term, negligible to minor, beneficial effects on wildlife within the park would be the same as outlined for Alternative B. Short-term, minor, localized, adverse effects resulting from construction activities would be the same as in Alternative B.

Alternative C would not result in impairment of wildlife resources or values.

Impacts of Alternative D: Provide 25-Year Flood Protection

The impacts to wildlife resources would be similar to those outlined for Alternative B, except that the area of short-term disturbance would be expanded to include a 67-acre-foot detention basin. This site would be located in the upper reaches of Hoover Creek. Over the long term, periodic inundation of the detention area would cause a succession of plant species to reflect an increase in available soil moisture. This would create additional long-term, negligible, localized, beneficial effects for wildlife, due to the increasing availability of water and aquatic plants. Breaking of agricultural tiles that currently drain the restored prairie directly into the creek would provide some benefit to the basin by dispersing the inflow over a longer period of time. This would produce overall long-term, localized, beneficial effects that would

be minor in intensity. The short-term effects from construction activities would be somewhat greater than those described in Alternative B, due to the increased size of the disturbed area. The short-term effects related to construction activities would be minor, localized, and adverse.

Cumulative Effects. There would be long-term, minor, beneficial effects to wildlife. Effects of other projects and plans would be similar to Alternative B. The beneficial effects from habitat improvements, however, would be enhanced by the detention basin's larger area. Cumulatively, there would be long-term, negligible to minor, localized, beneficial effects on wildlife.

Conclusion. There would be long-term, minor, localized, beneficial effects to wildlife, due to the increased habitat for species diversity. The short-term effects related to construction activities would be minor and adverse, considering the greater area of effect.

Alternative D would not result in impairment of wildlife resources or values.

Impacts of Alternative E: Provide 50-Year Flood Protection, the Preferred Alternative

The long-term, minor, localized, beneficial effects to wildlife would be similar to Alternative D, because of increased habitat availability and species diversity. The area of disturbance would be expanded to include a 138-acre-foot detention basin and embankment located in the upper reaches of Hoover Creek. Construction activities would increase accordingly from those described under Alternative D, and result in short-term, moderate, localized, adverse effects.

Cumulative Effects. There would be long-term, minor, beneficial effects to wildlife resources. Effects of other projects and plans under Alternative E would be similar to those described for Alternative B. Cumulatively, there would be long-term, negligible to minor, localized, beneficial effects on wildlife.

Conclusion. There would be similar effects on wildlife within the park as Alternative D. Additionally, the 138-acre-foot detention area and embankment would provide enhanced habitat for wildlife, producing long-term, minor, localized, beneficial effects. Short-term effects due to construction activities of channel improvements and the enlarged detention basin would be moderate, localized, and adverse.

Alternative E would not result in impairment of wildlife resources or values.

SUSTAINABILITY AND LONG-TERM MANAGEMENT

Unavoidable Adverse Impacts

Unavoidable adverse impacts are those environmental consequences of an action that cannot be avoided, either by changing the nature of the action or through mitigation if the action is taken. Therefore, they would remain throughout the duration of the action.

All of the action alternatives involve some excavation and fill activities, which would cause unavoidable adverse impacts to archeological resources from excavation and construction disturbance. These impacts would range from negligible to moderate, and vary by action

alternative. However, there would also be negligible to moderate benefits from stabilization of the stream channel and consequent reduced erosion, as well as enhanced flood protection.

There would be unavoidable adverse impacts to the visitor experience and interpretation of resources during project implementation under all of the action alternatives. Access to the stream corridor or portions of the restored prairie would be restricted, construction noise would be generated, and the cultural landscape temporarily disrupted. These effects would be somewhat offset by park efforts to interpret the stream management actions and accommodate visitors during construction.

Alternative D and Alternative E (the Preferred Alternative) include additional unavoidable adverse effects not present in Alternatives B and C: the installation of four large culverts at the embankment, visible from the tallgrass prairie. These fixtures would impact the quality of the viewshed and prairie landscape. However, this alternative allows the park to fulfill its mandate to protect historic structures and cultural resources and restore the commemorative landscape, without altering the structures themselves or significant degradation of other park resources. Under Alternative E, adverse effects of the detention pond on archeological resources and the cultural landscape would be negligible, because no archeological resources have been documented in the area and prior land use involved extensive disturbance. Disturbance from remeandering 500 feet of the stream course would present the risk of damage or loss to archeological resources and result in long-term, minor, adverse effects to cultural resources. However, the decreased rate of downward and lateral cutting and bank sloughing would reduce the risk of loss of archeological resources, providing negligible to minor, long-term benefits. The park's collections would be best protected under this alternative, and the beneficial effects would be moderate.

Water Resources

All of the action alternatives would involve channel reconfiguration, uniform bank elevation and stabilization, remeandering of the stream course, the installation of a grade control structure, and revegetation. The channel improvements would decrease flow velocity, down-cutting, and sedimentation, and the detention basin would detain floodwaters with controlled releases. The standardized cross section of the stream channel and standardized bank elevation would better accommodate water during flood events, and reduce the reach of flood waters. This would reduce the frequency and lateral extent of flooding and produce unavoidable, negligible, adverse effects to floodplains.

However, the area affected by the reduction of flood events is a manicured park setting where changes to the ecosystem from this action would be undetectable. The Historic Site is a cultural park, and the protection of cultural and historic resources contained therein is paramount. Alternative E best accommodates future flood events in that it includes all of the channel improvement elements, with the addition protection of a 138-acre-foot detention basin, which has the greatest capacity for detaining flood waters.

Relationship Between Local Short-term Uses of the Environment and the Maintenance and Enhancement of Long-term Productivity

The NPS must consider if the effects of project alternatives involve trade-offs of the long-term production and sustainability of park resources for the immediate short-term use of those resources. It must also consider if the effects of the alternatives are sustainable over the

long-term without causing adverse environmental effects for future generations (NEPA Section 102(c)[IV]).

None of the alternatives suggest substantial loss or impairment of historic, cultural, or natural resources as a consequence of their implementation. There would be some trade-offs from a local or short-term perspective. Each of the alternatives would trade-off the temporary disturbances to the stream, soils, vegetation, and wildlife for long-term flood protection of historic and cultural resources and improved stream functions.

The more effective an alternative is at protecting the park's historic and cultural resources and improving stream condition and function, the better that alternative is at protecting park resources as a whole, despite potential moderate, short-term impacts on the human and natural environment.

Irreversible or Irretrievable Commitments of Resources

The intent of this determination is to identify whether the alternatives would result in effects or impacts that could not be changed over the long term or would be permanent. An effect on a resource would be irreversible if the resource could not be reclaimed, restored, or otherwise returned to conditions that existed before the disturbance. An irretrievable commitment of resources involves the effects on resources that, once gone, cannot be replaced or recovered (NPS 2001).

The off-site allocation of some soils from excavation of the detention basin in Alternative E would be a permanent loss, as it would be removed from the park. The maximum amount feasible of excess soil would be reused within the park and virtually all topsoil would be retained. In addition, the excavation required for remeandering the stream course and creating the detention basin would present the risk of damage to or permanent loss of uncatalogued archeological resources. Though there is no evidence of archeological artifacts in the project area, the risk still remains for their existence and subsequent damage during project implementation.

CONSULTATION AND COORDINATION

SCOPING PROCESS AND PUBLIC INVOLVEMENT

The scoping process for this final SMP/EIS began in April 2004 with a meeting of the NPS planning team. The team discussed the purpose and need for a stream management plan and identified issues related to Hoover Creek.

In August 2004, the park notified the public of the intent to prepare a stream management plan and environmental impact statement in an announcement in the *Federal Register* (NPS 2004h). The notice invited the public to participate in the planning process.

Two public scoping meetings were held in the Herbert Hoover Presidential Library-Museum in August 2004 when the park staff presented information about the project and collected public comments on the desired future condition of the stream. Comments were also solicited on the issues the public believed should be considered in the creation of a stream management plan. A total of 16 people attended these meetings. The park continued to take comments from the public by telephone, e-mail, or letter until September 30, 2004. Input from the public included the following:

- Respondents expressed an overall desire to keep the area looking "natural," and not too engineered or artificial-looking.
- Meeting attendees were particularly interested in learning about how the stream has been meandering, the causes of the erosion occurring in the stream banks, and possible solutions for halting the degradation.
- Several ideas were proposed for ways to maximize the use of stream flow management devices as attractive assets for the park, such as using drop structures to create the sound of falling water.
- It was noted that willows should be preserved to the extent possible during the stabilization work, due to Herbert Hoover's fondness for them.
- The public consistently expressed the need to preserve the vistas from the picnic shelters.
- Many requested that buildings and landscaping at the park be kept as close as possible to their appearance in 1965, when the layout design was approved by the Hoover family.
- Some respondents believed there should be a buffer unit along the corridor of the stream to discourage people from approaching and touching the water, for safety reasons and for preservation of the stream bed from damage. Others wanted safe approaches to the stream so that school children could study aquatic resources.
- Public respondents also expressed the hope that wetland and prairie grasses near the stream may encourage wildlife use in the area.

Some respondents sent in information after the meetings regarding research they have done or procedures they have developed; including a low-impact, non-invasive silt trap for the eroding stream banks (STEPP™) and a research paper on the management of an exotic grass

species (Reed canary grass) by the use of herbicides and displacement by seeding with native species.

Following the September 2005 release of the draft SMP/EIS, there was a 60-day public review and comment period on the document. The notice of availability of the draft SMP/EIS was published in the *Federal Register* by the EPA on September 9, 2005. The park distributed approximately 30 copies of the draft SMP/EIS to individuals, groups, and government agencies. Letters were also sent to interested parties on the availability of the EIS through request, the park's website, and in four local community libraries.

Two public meetings were held at the park on October 12, 2005 following the release of the draft SMP/EIS. NPS interdisciplinary team members were available at the public meetings to answer questions concerning the environmental impact statement. The public was also encouraged to comment via letter, Internet, and electronic mail. The NPS provided notification of the public meeting on the park website and through press releases to newspapers. A total of 35 individuals attended the two public meetings. No substantive comments were received verbally during the meeting; however, one individual, the mayor of West Branch, submitted written comments at the conclusion of the meeting. The consensus of the public during the presentations was that the NPS should pursue the correct path for the park by following Alternative E, the Preferred Alternative.

The NPS received a total of 10 comments during the comment period. Comments were received by letter, electronic mail, and hand-submitted during public meetings. Comments were received from the city of West Branch and state and federal agencies; no substantive comments from the public were received. All substantive comments are reprinted below in the section "Comments and Responses on the Draft SMP/EIS", and the NPS responses to substantive comments are also provided in that section. This final SMP/EIS includes corrections and additions based on the substantive comments received. Comments from public agencies did not require the NPS to add other alternatives, significantly alter existing alternatives, or make changes to the impact analysis of the effects of any alternative.

ENDANGERED OR THREATENED SPECIES CONSULTATION

In accordance with section 7 of the Endangered Species Act (16 U.S.C. 1531 *et seq*.), the NPS contacted the U.S. Fish and Wildlife Service by letter on August 6, 2004 to initiate informal consultation (see Appendix A). In addition, the draft SMP/EIS was submitted to the U.S. Fish and Wildlife Service in September 2005 for their review as part of the consultation process. The Service agreed with the park's finding of no effect on threatened and endangered species. Their response can be found in Appendix A.

CULTURAL RESOURCES CONSULTATION

On August 6, 2004 the NPS sent letters to the Iowa State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (Appendix A). The letters invited them to participate in the planning process and informed them that the NPS plans to use this environmental impact statement to fulfill the requirements of §106 of the National Historic

Preservation Act as well as comply with provisions of the National Environmental Policy Act.

The agency responded on August 23, 2004, with a request for some additional information on the Area of Potential Effect. The Iowa SHPO reviewed a complete copy of this document and commented on the plan, but did not concur with the National Park Service findings of "no adverse effect" for the project (see correspondence dated February 7, 2006 in "Comments and Responses on the Draft SMP/EIS" below). A Programmatic Agreement was subsequently drafted and signed by the Iowa SHPO and the National Park Service (Appendix F). Additional provisions were added to this FEIS in response to SHPO comments and requirements in the Programmatic Agreement. A copy of this final SMP/EIS will be sent to the Iowa SHPO and to the Advisory Council on Historic Preservation for their information.

U.S. ARMY CORPS OF ENGINEERS CONSULTATION

On August 6, 2004 the NPS sent letters to the U.S. Army Corps of Engineers to provide notification of the draft SMP/EIS and to invite them to participate in the planning process. The agency responded on September 13, 2004, notifying the NPS of standard requirements for Department of the Army authorizations. The joint information packet and application form for the U.S. Army Corps of Engineers and Iowa Department of Natural Resources (entitled "Protecting Iowa Waters") can be found on the Internet at http://www2.mvr.usace.army.mil/Regulatory/JointApplicationPackets/Iowa/Iowa-Index.html. The draft SMP/EIS was submitted to the U.S. Army Corps of Engineers for their review, and their response letter can be found in Appendix A.

IOWA DEPARTMENT OF NATURAL RESOURCES PERMITS

The Iowa Department of Natural Resources has authority to regulate construction on all floodplains and floodways in the state, in order to establish and implement a program to promote flood protection, and promote the development and use of floodplains. A Floodplain Development Permit is required for any entity that wishes to construct, excavate, or deposit any fill material within a floodplain or floodway, after agency determination of necessary approval from the department or a local government authorized to act on behalf of the department. In addition, the department manages the National Pollutant Discharge Elimination System (NPDES) and requires that projects involving land-disturbing construction activities obtain the appropriate stormwater discharge permit. The NPS will work in conjunction with the department throughout the design process, to ensure appropriate compliance as construction details are made available.

LIST OF PREPARERS AND CONTRIBUTORS

Herbert Hoover National Historic Site

Bruce McKeeman, Superintendent

Neil Korsmo, Chief Ranger

Sherry Middlemis-Brown, Biologist

Dan Peterson, Education Specialist

Midwest Regional Office

Nick Chevance, Regional Environmental Coordinator

Parsons

Jacklyn Bryant, Project Manager

Bruce Snyder, Technical Director

Gary Lewis, Water Resources Engineer

Dan Greaves, Water Resources Engineer

Diane Rhodes, Cultural Resource Specialist

Kumar Vedulla, Water Resources Engineer

Nicole Winterton, Environmental Scientist

Lee Monnens, Environmental Scientist/Geologist

Janice Biletnikoff, Environmental Planner

Michelle Johnson, Environmental Scientist

LIST OF RECIPIENTS

The following agencies, tribes, groups, and organizations have been identified as having an interest in this issue and NEPA decision-making process. Each listed entity, as well as numerous interested individuals, was sent a copy of the draft environmental impact statement.

Federal Agencies

Advisory Council on Historic Preservation
National Park Service, Water Resources Division
U.S. Army Corps of Engineers
U.S.D.A., Natural Resources Conservation Service
U.S. Environmental Protection Agency, Region 7
U.S. Fish and Wildlife Service
U.S. Geological Survey
Congressman Jim Leach
Senator Charles Grassley
Senator Tom Harkin

State of Iowa

Iowa Department of Natural Resources
Iowa Department of Natural Resources, Water Resources Division

Iowa Geological Survey
State Historical Society of Iowa

Local Governments

Cedar County Supervisors
City of West Branch

Libraries

Coralville Public Library, Coralville, Iowa
Herbert Hoover Presidential Library-Museum, West Branch, Iowa
Iowa City Public Library, Iowa City, Iowa
Tipton Public Library, Tipton, Iowa
West Branch Public Library, West Branch, Iowa

Businesses and Organizations

Friends Church
Herbert Hoover Presidential Library Association
West Branch Friends Meeting

COMMENTS AND RESPONSES ON THE DRAFT SMP/EIS

The NPS received a total of 10 substantive comments on the draft SMP/EIS.

The Council on Environmental Quality (1978) guidelines for implementing the National Environmental Policy Act require the NPS to respond to "substantive comments." A comment is substantive if it meets any of the following criteria from Director's Order 12, "Conservation Planning, Environmental Impact Analysis, and Decision-Making" (NPS 2001).

- It questions, with reasonable basis, the accuracy of information.
- It questions, with reasonable basis, the adequacy of environmental analysis.
- It presented reasonable alternatives other than those proposed in the plan.
- It would cause changes or revisions in the preferred alternative.

The documents containing substantive comments, and the NPS responses, are included in the following pages. All consultation letters received from federal, state, and local agencies are also reprinted in full in Appendix A.

TABLE 12. COMMENTS TO RESPONSES RECEIVED

COMMENTS	RESPONSES
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION VII 901 NORTH 5TH STREET KANSAS CITY, KANSAS 66101 17 OCT 2005 Mr. Bruce McKeeman, Superintendent Herbert Hoover National Historic Site 110 Parkside Drive, PO Box 607 West Branch, IA 52358 Dear Mr. McKeeman: RE: EPA Review of Draft Hoover Creek Stream Management Plan and Environmental Impact Statement (DEIS) The Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (FEIS) for the subject proposal. Our review is provided pursuant to the National Environmental Policy Act (NEPA) 42 U.S.C. 4231, Council on Environmental Quality (CEQ) regulations 40 C.F.R. Parts1500-1508, and Section 309 of the Clean Air Act (CAA). The DEIS was assigned the CEQ number 20050390. The DEIS analyzes alternatives to address flood protection to Historic resources at the Herbert Hoover Historic Site, which is located in West Branch, Iowa. Four action alternatives and the no-action alternative are discussed in the DEIS. The action alternatives discussed in the DEIS consist of: Alternative B - Provide 10-Year Flood Protection, Alternative C - Provide 15-Year Flood Protection, Alternative D - Provide 25-Year Flood Protection, and Alternative E - Provide 50 -Year Flood Protection. The Preferred alternative is stated to be Alternative E. Based on the procedures EPA uses to evaluate the potential effects of proposed actions and the adequacy of the information in the DEIS, the Preferred Alternative will be listed in the Federal Register in the category 'LO' or 'lack of objections' (see enclosure for EPA ratings criteria and definitions). The rating means that EPA's review did not identify potential environmental impacts that require substantive changes to the proposal. EPA does note that 1 Appendix D highlights the role of the Iowa Department of Natural Resources in maintenance of water quality, but is not specific to the need for a stormwater permit under the National Pollutant Discharge Elimination System (NPDES). Such permits are required for soil disturbance over 1 acre in size. Please ensure coordination with IDNR on specific permitting and erosion control requirements.	1. Text was inserted into the "Consultation and Coordination" section and Appendix D of this final SMP/EIS to specifically address the need for a stormwater permit under the National Pollutant Discharge Elimination System (NPDES), which is managed by the Iowa Department of Natural Resources.

COMMENTS	RESPONSES
Thank you for the opportunity to comment on this project. If EPA can be of further assistance, please contact me at (913) 551-7148 or cothern.joe@epa.gov. Sincerely, Joseph E. Cothern NEPA Team Leader Environmental Services Division	

COMMENTS	RESPONSES
United States Department of the Interior NATIONAL PARK SERVICE Water Resources Division 1201 Oak Ridge Drive, Suite 250 Fort Collins, CO 80525 October 12, 2005 IN REPLY REFER TO: HEHO/General * ELECTRONIC COPY – NO HARD COPY TO FOLLOW * Memorandum To Bruce D. McKeeman, Superintendent, Herbert Hoover National Historic Site From Rick Inglis, Hydrologist, Water Resources Division Subject Stream EIS for Herbert Hoover National Historic Site (HEHO) Thank you for the opportunity to comment on the Draft Hoover Creek Stream Management Plan EIS. It is well written and has nice graphics and photographs. 2 In the EIS there are numerous references to stream function, natural hydrograph, restoration, and historic channel conditions that are not appropriate to this document based on the proposed engineered design of Hoover Creek. I understand that the Park has been affected by numerous floods and wishes to reduce hazards and risk to their unique cultural resources. The preferred alternative proposes to construct a detention dam and a floodway through the historically important area. However, much of the EIS discusses elements of natural channel restoration, which I don't believe is feasible at HEHO due to the cultural constraints. On page 37, a standardized design for the Hoover Creek channel is presented, which appears to be the result of flow modeling using HEC-RAS. The resulting trapezoidal channel is described below, taken directly from the EIS. 3 *This new channel would consist of 1,200 feet of standardized cross section, 500 feet of new meander pattern, a grade control structure to eliminate down-cutting, and reclamation of the portions of the existing channel after the new meanders are complete. The new channel would have a consistent bottom width, uniform stream bank elevation and slope ratios, constant channel capacity, and new meander pattern to slow flow velocity (see Figure 15).* This description of the channel design describes a simple floodway. For a natural channel design a reference channel is usually identified to adopt channel design parameters. It is not likely that a natural stream in that part of Iowa in a watershed of similar area would have channel geometry	2. The intent of the alternatives is not to restore a natural channel, as this is not feasible due to constraints of the cultural park setting and present context of the surrounding watershed. The intent is to restore structure and function of the stream to provide a higher level of flood protection and make it a more stable, self-sustaining system that is less sensitive to disturbance. Additional text has been added in "Methods Used to Develop Levels of Flood Protection and Improved Stream Function" in the "Development of the Alternatives" section to provide further clarification. 3. As described in the response to comment 2 above, the approximated channel design described in the EIS is not intended to restore a natural stream channel, but it is of a configuration to increase flood protection and restore structure and functions of the stream applicable to this particular stream. The use of a "reference channel" for design is typically a standard for restoration of natural channels. Identification of a reference channel was attempted early in the study, primarily to assist in identifying and evaluating functions that could be restored, but quickly failed to provide a solid standard. A few of the neighboring rural watersheds were studied, but the widespread and extensive agricultural development has left the area void of what might have been a reasonable standard. In the absence of a reference reach, a design using Rosgen's stream type classification was chosen to identify where the existing stream fell within the range, and to implement treatments that would shift its classification toward more stable classifications (rather than toward the "natural" stream type). Further text describing the use of Rosgen's stream type classification has been added in "Methods Used to Develop Levels of Flood Protection and Improved Stream Function" in the "Development of the Alternatives" section of this final SMP/EIS. In addition, while revisiting the design during comment analysis, it was identified that the length of stream channel within the park with the standardized cross section would be approximately 1,500 feet (versus 1,200 feet). With the additional 500 feet of new meander pattern and channel template, the approximate total length of stream affected would be about 2,000 feet. Therefore, this and the subsequent increase in acres disturbed were also updated in

COMMENTS	RESPONSES
3 of this uniformity and dimension. Additional stream designing is needed to describe details of the proposed steam realignment and utilize the ideas contained in the EIS. Floodways, as described by the EIS design, function by conveying water out of an area as efficiently as possible by reducing friction losses–as opposed to fully functioning streams and floodplains, which attenuate floods by spreading the floodwaters through thick and durable riparian vegetation, which the EIS discusses extensively.	the "Alternatives" section and throughout the final SMP/EIS, where applicable. No change in the analysis has resulted from this update.
4 On page 38, the next paragraph in the EIS quoted below states what the goal for the project is but does not say how the NPS will achieve this desired condition, let alone if it is feasible or not. In my experience, the contrast of the above and below statements from the EIS presents a conflict of design and purpose that will be extremely challenging to resolve. Many of the stream function goals, such as installing native riparian vegetation and creating meanders (to reduce flow velocity), will impede with the ultimate objective of alleviating floods. *In addition, the stream function goal for the new channel would be to establish a course that has low sensitivity to disturbance and very good recovery potential when disturbed (such as by the 50- or 100-year flow event). Recovery potential means the channel has the tendency to remain in its position, has decreased erosion and down-cutting, and maintains a community of riparian vegetation and aquatic plants and animals (Dunne and Leopold 1978). The stream function goal for Hoover Creek is Rosgen's stream classification Type C (see Appendix E), which would be the target future condition for all action alternatives.* In summary, restoring a natural channel is the apparent goal of the EIS. The proposed design does not achieve that, but would be effective in passing a flood of a 50-year return period. ec: 2380 – Jackson, Flora, Rosenlieb, Smillie.	4. The commenter is correct in that the proposed alternatives in the EIS were designed to increase the level of flood protection. They were also intended to restore structure and function as applicable to this particular stream in a suburban park and as feasible with the surrounding watershed. Additional text has been added in "Methods Used to Develop Levels of Flood Protection and Improved Stream Function" in the "Development of the Alternatives" section to provide further clarification on project goals. The text cited in the comment, which is included in "Channel Characteristics" in "Elements Common to All Action Alternatives", has also been reworded in the final SMP/EIS to focus more on those factors being improved in this particular stream, primarily entrenchment, sensitivity to disturbance, and recovery potential. In addition, clarification text in this same section was also added to preface that although the target stream classification is Rosgen Type C, practical limitations may prevent a full shift to this class along the entire corridor because some design criteria cannot be altered in stretches where remeandering would not occur. Therefore, it is anticipated that some reaches of the creek could fall between C and E stream types and would likely demonstrate a mix of characteristics of both. The result would likely be a C to E type stream channel, which is "highly stable" and would be a substantial improvement over existing conditions along the stream corridor. Overall, the channel would be highly stable, slightly entrenched, sinuous, less sensitive to disturbance, and would have increased recovery potential. No changes to the analysis have resulted from this additional text.

COMMENTS	RESPONSES
A list of questions were submitted by West Branch Mayor Sandra Hatfield immediately following the public meeting held at the park on October 12, 2005. A response letter with answers to specific questions was submitted to the city of West Branch, and substantive comments and responses are included below. 5 What is the reference benchmark for the elevations in the report? 6 What are City assurances this project won't cause upstream flooding? 7 What is the exact location of the proposed detention area? Can it be flagged? 8 Will this have an adverse effect on the City or was that not taken into account and only area being considered is NPS? Small portion of City is NPS and creek flows through City; were benefits and impacts considered outside the park? 9 Why protect to 50-year flood instead of 100-year flood event? 100-year seems to be the event all agencies want to protect against. 10 Are elevations outside park and north side of Main lower than proposed pond? And if so, what happens when pond fills up? No water ever on West Main?	5. Topographic data was used during conceptual design, which came from the USGS 2004 Herbert Hoover Flood Inundation Mapping Study (USGS no date), with the two-foot contour intervals originally provided by the NPS. This mapping study was based off of original HEC-RAS modeling performed by the USGS following the 1993 flood. In this USGS report, developed by Robert Einhellig, is a list of reference marks. The elevations taken closest to the proposed detention basins were taken from a surveyor's monument in the southeast part of West Branch based on the National Geodetic Vertical Datum as determined from the U.S. Coast and Geodetic Survey Disk: V 76 1934. Additional reference marks were identified on several structures throughout the stream study area (Main Street to I-80) using closed-loop differential leveling and are included in the USGS report attached to the NPS' response letter to the city of West Branch for future reference. 6. The conceptual design was preliminary in nature to determine the general extent and magnitude of action that would be required to meet the objectives of the project. Concerns of upstream flooding were included in engineering of the conceptual design, and the approximate elevations and storage presented in the draft SMP/EIS were designed to be below the elevation of Main Street so that water would be contained on park lands and overtop the downstream embankment before roads were inundated (see the text addressing this topic in the description of Alternatives D and E in the "Alternatives" section of both the draft and final SMP/EIS. During extreme events, the storm water detention basin could reach a level pool that effects to property owners upstream of Main Street would be a concern. The conceptual design was preliminary in nature to determine the general extent and magnitude of action that would be required to meet the objectives of the project. Concerns of upstream flooding were included in engineering of the conceptual design, and the approximate elevations and storage presented here were not shown to cause upstream flooding in preliminary analysis. However, preliminary analysis did not incorporate detailed hydraulic analyses of the North Tributary upstream of the Main Street Bridge. Detailed hydraulic

COMMENTS	RESPONSES
	analyses and engineering design for this location would be completed for the selected alternative prior to implementation of the project. It is assumed that final detention basin design would be modified so that upstream flooding would not occur as a result of project implementation. If the design analysis were to show an effect of the detention basin to property upstream of Main Street, then the design of the detention basin would be modified to eliminate this effect. More detailed information on this topic has been integrated into the descriptions of Alternatives D and E (of the "Alternatives" chapter) in this final SMP/EIS for clarification. Information has also been added in these same sections with examples of some design variations that could occur to the detention basin if detailed analysis indicated any potential for upstream flooding. 7. The SMP/EIS identifies the general area for the detention basin in the description of Alternatives D and E in the "Alternatives" chapter, which is in the northwest area of the park between the Thompson Farm Road and the park boundary just south of West Main Street. The exact location of the basin would be determined during construction design, depending on the alternative selected (Alternative D or E). Until more detailed design documents are developed, the exact location cannot be flagged. 8. As described in the response to comment 6 above, the analysis was conducted assuming that all phases of engineering design for the selected alternative would consider and eliminate any potential for upstream flooding, and that final construction designs could likely include variations to the approximations presented in the SMP/EIS to ensure that no effects occur as a result of project implementation. 9. The park initially considered an alternative of 100-year flood protection, but later eliminated it from further study. The rationale for dismissal has been described in the "Alternatives Eliminated From Further Consideration" section in the "Alternatives" chapter. This alternative was dismissed because it would have either required a much larger detention basin, larger than could have been contained on park property without substantial resource damage, or would have involved greater level of adverse impacts on the cultural landscape and

COMMENTS	RESPONSES
	viewshed. These impacts were determined to be too great and were unacceptable to NPS staff. As described in "Elements Common to all Action Alternatives", when flood events of greater magnitude than the design capacity for an alternative occur, the park would implement their flood emergency plan and respond appropriately to the threat level. Measures would be taken to protect park resources, public health and safety, and the visitor experience. 10. The stormwater detention basin could create a pool level that could possibly affect property owners upstream of Main Street. The conceptual design was preliminary in nature to determine the general extent and magnitude of action that would be required to meet the objectives of the project. Concerns of upstream flooding were included in engineering of the conceptual design, and the approximate elevations and storage presented here were not shown to cause upstream flooding in preliminary analysis. However, preliminary analysis did not incorporate a detailed hydraulic analysis of the North Tributary upstream of the Main Street Bridge. Detailed hydraulic analyses and engineering design for this location would be completed for the selected alternative prior to implementation of the project. It is assumed that final detention basin design would be modified so that upstream flooding would not occur as a result of project implementation. If the analysis were to show an effect of the detention basin to property upstream of Main Street, then the design of the detention basin could be modified to eliminate this effect. Modifications that would lower the pool elevation include lowering the top of embankment elevation. This option alone reduces the storage capacity of the detention basin and therefore reduces the level of protection. To offset this effect, additional storage would have to be excavated either from the hillside to the south or from the bottom of the basin. It is also possible that the effect of the detention basins on the upstream property could be completely or partially eliminated by cleaning the channel upstream of Main Street.

COMMENTS	RESPONSES
STATE HISTORICAL SOCIETY of IOWA A Division of the Iowa Department of Cultural Affairs February 7, 2006 **In reply refer to:** **R&C#: 890516224** Neil Korsmo, Acting Superintendent United States Department of the Interior National Park Service Herbert Hoover National Historic Site P O. Box 607 West Branch, Iowa 52358-0607 RE: NPS - CEDAR COUNTY - HERBERT HOOVER NATIONAL HISTORIC SITE – DEVELOPMENT OF A STREAM MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT – DRAFT STREAM MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT Dear Mr. Korsmo, 11 Thank you for providing our office an opportunity to review the above referenced draft document. We understand that this project will be a federal undertaking for your agency, the National Park Service, and will need to comply with Sections 106 and 110 of the National Historic Preservation Act and with the National Environmental Policy Act. We apologize for our lengthy delay in response. We agree that most of the alternatives including the preferred alternative would more than likely benefit many of the cultural resources at the Herbert Hoover National Historic Site **However, at this time, we believe it is premature to concur with a No Adverse Effect determination for this undertaking under 36 CFR 800.5.** In our opinion, consultation between our agencies and other interested parties has not been completed regarding the definition of the Area of Potential Affect for this undertaking and the identification of historic properties under 36 CFR 800 4. Particularly, there are already two recorded archaeological sites (13CD147 and 13CD150) located immediately adjacent to the creek that have not been evaluated for their potential eligibility for listing on the National Register of Historic Places. It is discussed in ***An Archeological Overview and Assessment of the Herbert Hoover National Historic Site, West Branch , Iowa*** prepared by Upper Midwest Archaeology in 2005 that there is a high potential for additional archaeological sites in the area immediately adjacent to the creek. A recommendation was made in that report to conduct systematic examinations of the floodplain and immediate terraces along the creek. We note that we just received for review and comment a copy of the ***Herbert Hoover National Historic Site Cultural Landscape: Inventory Unit Summary and Site Plan***. We note that neither one of these studies were referenced in this document and that the findings and recommendations of these studies were not incorporated into or addressed within this document. We are confused why a Phase I archeological survey to identify potentially eligible archaeological sites is not listed as a top priority to complete prior to any ground disturbing activities on any of the alternatives. We understand that monitoring of construction activities for previously unidentified archaeological deposits and sites is the preferred method to be implemented for the cultural resources during the course of construction as proposed in Table 7 and Alternatives D and E as part of the **No** 600 East Locust Street, Des Moines, IA 50319-0290 P: (515) 281-5111	11. This comment resulted in further consultation between the National Park Service and the Iowa SHPO. A programmatic agreement was developed between the two groups and is attached as Appendix F.

COMMENTS	RESPONSES
11 **Adverse Effect** determination. We also understand that any archeological sites encountered would be evaluated and mitigated either by avoidance or excavation. **We do not concur with these conclusions.** We believe that this method for dealing with any encountered archeological sites is not appropriate to be used for this scale of proposed construction activities at a National Historic site with known significant historic properties and considerable potential for containing significant archeological sites and deposits. We are very concerned that these methods are more likely to have **Adverse Effects** on any encountered significant archeological sites because the sites will probably be affected by construction activities before they are identified. Also, consideration of alternatives after identification would be heavily weighted toward excavation and destruction of the site as avoidance and preservation of sites will be less feasible under construction. We also note that there is no discussion about how Section 106 consultation will be carried out for any identified historic properties during the monitoring activities. If your agency chooses to implement this strategy, we recommend in these types of situations that the responsible federal agency should develop and implement a legal agreement (either a Memorandum of Agreement or a Programmatic Agreement) to establish a course for concluding the section 106 consultation process and outline mitigation strategies for historic properties that will be affected. The purpose of a legal agreement in this case would be to help facilitate consultation on proposed mitigation strategies, such as data recovery excavations or preservation by avoidance, as well as to help facilitate the consultation with other parties that may have an interest in this historic property. The basic premise of complying with 36 CFR Part 800 involves identification of any historic properties that could be affected by the proposed undertaking. We recommend that the best way to determine whether this proposed project will affect any significant archeological sites is to conduct a Phase I Archaeological survey of the proposed project area. The survey should be conducted prior to any land disturbance or construction activities. The purpose of the Phase I archaeological survey is to locate and evaluate the significance of any presently unidentified archaeological or historical sites which may be affected by the proposed undertaking. We will be in a better position to comment on this project once we have received the results of a formal field investigation and have a better understanding of the project area of potential effects and the cultural resources that it might contain. We recommend that your agency should strongly consider conducting an archaeological survey within the Area of Potential Effect for this proposed undertaking. Because of these issues with the preliminary identification of historic properties that could be affected by the undertaking, it is our opinion that it remains unclear how both the currently identified and unidentified archaeological sites will be affected by this proposed undertaking. It is also unclear what the affect to the overall cultural landscape would be with the preferred alternative. **For these reasons, we can not currently concur that this undertaking as represented by the preferred alternative will not adversely affect any significant historic properties at the Herbert Hoover National Historic Site.** In addition, we do not concur with the conclusions regarding the Historic and Cultural Properties in the Impacts to Floodplain Values or Risks to Life and Property section within the Floodplain Statement of Findings in Appendix B. First of all, it appears that the conclusions regarding the effects on the cultural	

COMMENTS	RESPONSES
11 landscape discussed under Alternative E on page 110 appear to contradict the conclusion presented in the Impacts to Floodplain Values or Risks to Life and Property section within the Floodplain Statement of Findings. Also, we note that the potential effects to any significant archaeological sites within the Area of Potential Effect were not addressed at all. **We have made these comments and recommendations according to our responsibility defined by Federal law pertaining to the Section 106 process. Your agency does not have to follow our comments and recommendations to comply with the Section 106 process. It remains your agency's decision on whether or not to provide additional information to our office or whether or not to proceed with the project without the concurrence of this office. It also remains your agency's decision on how you will proceed from this point for this project.** Please reference the Review and Compliance Number provided above in all future submitted correspondence to our office for this project. Once again, we thank you for the opportunity to review the document. We look forward to further consulting with you on this undertaking. If you have any further questions, please feel free to contact us at the numbers provided below. Sincerely, Douglas W. Jones, Archaeologist State Historic Preservation Office State Historical Society of Iowa (515) 281-4358 Ralph J. Christian, Historian State Historic Preservation Office State Historical Society of Iowa (515) 281-8697 cc: Rachel Franklin Weekley, National Historic Landmark Coordinator, NPS - Midwest Office Dawn Bringelson, Archeologist, Midwest Archeological Center, NPS NPS-Midwest Regional Office (N. Chevance) Parsons-Denver (J. Bryant and D. Rhodes) Cary Wiesner, NPS HEHO Lowell J. Soike, Deputy Iowa State Historic Preservation Officer	

This page intentionally left blank.

REFERENCES

BIBLIOGRAPHY

Advisory Council on Historic Preservation

2006 *Recommended Approach for Consultation on the Recovery of Significant Information from Archaeological Sites.* Accessed on the Internet at http://www.achp.gov/archguide.html.

Bureau of Land Management (BLM), U.S. Department of the Interior

2003 Riparian Area Management, A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lentic Areas. Technical Reference 1737-16.

Doermann, Ty

2004 West Branch City Administrator, personal communication

Dunne, T. and L.B. Leopold

1978 *Water in Environmental Planning.* W.H. Freeman and Company, New York.

Federal Emergency Management Agency (FEMA)

1986 Floodproofing Non-residential Structures. FEMA, Washington D.C.

Federal Interagency Stream Restoration Working Group

1998 Stream Corridor Restoration: Principles, Processes, and Practices. GPO Item No. 0120-A. Accessed on the Internet at http://www.nrcs.usda.gov/technical/stream_restoration/.

Gough, G.

2004 The Changing Midwest Assessment: Relative Abundance Henslow's Sparrow, 1970-2000. U.S. Forest Service, North Central Research Station. Accessed on the Internet at http://ncrs.fs.fed.us/4153/deltawest/plantanimal/henslow001.asp.

Iowa Department of Natural Resources (IDNR)

2002 Chapter 77: Endangered and Threatened Plant and Animal Species. Natural Resources Commission. Accessed on the Internet at http://www.iowadnr.com/other/files/chapter77.pdf

2004 Iowa DNR Floodplain Development Permit Requirements. Accessed on the Internet at http://www.iowadnr.com/water/floodplain/fppermitsw.html

2005 Iowa DNR Water Quality Standards. Designated Uses of Iowa's Surface Waters. Accessed on the Internet at http://www.iowadnr.com/water/standards/designated.html.

Iowa Geological Survey (IGS)

2003 Landform Regions of Iowa. Accessed on the Internet at http://www.igsb.uiowa.edu/browse/landform.htm.

Korsmo, Neil

2005 Korsmo, Neil, Chief Park Ranger, Herbert Hoover National Historic Site. personal communication. 1-20-2005

McKeeman, Bruce

2005 McKeeman, Bruce. Park Superintendent, Herbert Hoover National Historic Site. personal communication. 8-29-2005.

Melde, P.B. and R. Koford

1996 Henslow's Sparrow nesting observations, habitat associations and history in Iowa. Iowa Bird Live 66:117-122 (1996). Accessed on the Internet at http://www.public.iastate.edu/~rkoford/hesp.htm.

Middlemis-Brown, Sherry

2005 Middlemis-Brown, Sherry, Park Natural Resource Specialist, Herbert Hoover National Historic Site. personal communication. 1-18-2005.

NPS, U.S. Department of the Interior

n.d. *Historic Structures Report, The Hoover Houses and community Structures, Herbert Hoover National Historic Site, West Branch Iowa,* by Edwin C. Bearss. United States Department of the Interior, NPS.

1968 *Historical Base Map and Grounds Study: Herbert Hoover 1874-1886, Herbert Hoover national Historic Site, West Branch, Iowa,* by Edwin C. Bearss. Division of History, Office of Archeology and Historic Preservation, NPS.

1970a *Archeological Test Excavations at Herbert Hoover National Historic Site, Iowa: Jesse Hoover's Blacksmith Shop and Original Penn Street,* by Wilfred M. Husted. On file, NPS, Midwest Archeological Center, Lincoln, Nebraska.

1970b *Herbert Hoover National Historic Site, Buildings in the Core-Area and Jesse Hoover's Blacksmith Shop: Historic Structures Report,* by Edwin C. Bearss and Wilfred M. Husted.

1971 *Historic Structures Report, The Hoover Houses and Community Structures, Herbert Hoover National Historic Site, West Branch, Iowa,* by Edwin C. Bearss. United States Department of the Interior, NPS.

1973a *Historic Furnishing Study: Primary Department of the West Branch School and Jesse Hoover's Blacksmith and Wagon Shop, Herbert Hoover National Historic Site, West Branch, Iowa,* by Edwin C. Bearss. NPS, Denver Center, Historic Preservation Team.

1973b *The Jesse Hoover Blacksmith Shop*, by Adrienne D. Anderson. On file, NPS, Midwest Archeological Center, Lincoln, Nebraska.

1976 National Register of Historic Places Inventory – Nomination Form, Herbert Hoover National Historic Site. NPS, Midwest Region, Omaha, Nebraska.

1982a *Ground-Penetrating Radar Surveys at the Second Hoover House and at Effigy Mounds, Iowa*, by Bruce Bevan. Geosight , Pitman, New Jersey. On file, NPS, Midwest Archeological Center, Lincoln, Nebraska.

1982b *Historic Structure Report, Eleven Core Area Buildings, Herbert Hoover National Historic Site, West Branch, Cedar County*, Iowa, by William J. Wagner. United States Department of the Interior, NPS.

1983 Trip Report, October 25-30, 1983 (Mackey House, Herbert Hoover NHS) by W.E. Suddereth. Dated December 27, 1983. On file, NPS, Midwest Archeological Center, Lincoln, Nebraska.

1986 Trip Report, Trip to Herbert Hoover NHS, April 21 – 24, 1986, by Jeffrey J. Richner. Dated April 30, 1986. On file, NPS, Midwest Archeological Center, Lincoln, Nebraska.

1988a Trip Report, Herbert Hoover National Historic Site: Foundation Testing at H.S. 11, by Kristin L. Griffin. Dated October 19, 1988. On file, NPS, Midwest Archeological Center, Lincoln, Nebraska.

1988b Trip Report by Forrest Frost. Dated November 17, 1988. On file, NPS, Midwest Archeological Center, Lincoln, Nebraska.

1989a Trip Report, Herbert Hoover by Forest Frost. Dated October 11, 1989. On file, NPS, Midwest Archeological Center, Lincoln, Nebraska.

1989b Trip Report, Herbert Hoover by Forest Frost. Dated October 11, 1989. On file, NPS, Midwest Archeological Center, Lincoln, Nebraska.

1989c Trip Report, Herbert Hoover National Historic Site by Forest Frost. Dated December 19, 1989. On file, NPS, Midwest Archeological Center, Lincoln, Nebraska.

1991a *Herbert Hoover National Historic Site: Collection Management Plan,* by Ann Jordan, Brigid Sullivan, and John E. Hunter. Curatorial Services Division, Washington, D.C. On file, Harpers Ferry Center.

1991b Trip Report, Test Excavations at Hoover Birthplace Cabin (HS-1) and Proposed Water Line for Hoover Library at Herbert Hoover National Historic Site (HEHO) by William J. Hunt, Jr. Dated August 16, 1991. On file, NPS, Midwest Archeological Center, Lincoln, Nebraska.

1992a Salvage Archeology at the Herbert Hoover National Historic Site: The Mackey House, 1983, by W. E. Sudderth. *Midwest Archeological Center Technical Report 12.* On file, NPS, Midwest Archeological Center, Lincoln, Nebraska.

1992b Trip Report, January 26-29, 1992, by Forest Frost. Dated January 31, 1992. On file, NPS, Midwest Archeological Center, Lincoln, Nebraska.

1993 Flood Damage Effects Assessment: Herbert Hoover National Historic Site. Prepared by R. Klukas, NPS Midwest Regional Office. On file at Herbert Hoover National Historic Site.

*199*5a *Herbert Hoover National Historic Site: Cultural Landscape Report.* Joint project of NPS Midwest Region, Omaha, Nebraska and Land and Community Associates, Dunbar/Jones Partnership; Snyder & Associates, Inc.; John Milner Associates; and Andropogon Associates, Ltd. Omaha, Nebraska, NPS, Midwest Region.

1995b *The Secretary of the Interior's Standards for the Treatment of Historic Properties: with Guidelines for Preserving, Rehabilitating, Restoring & Reconstructing Historic Buildings*. By Kay D. Weeks and Anne E. Grimmer. Washington, D.C.: NPS, Preservation Assistance Division, Cultural Resource Stewardship and Partnerships, Heritage Preservation Services. Accessed on the Internet at http://data2.itc.nps.gov/npspolicy/DOrders.cfm.

1996a Archeological Tests at the Hoover Birthplace cottage (HS-1) and Shovel-Test Survey Along the Route of a New Waterline to the Hoover Library Addition, Herbert Hoover National Historic Site, West Branch, Iowa, by William J. Hunt, Jr. *Midwest Archeological Center Technical Report 48.* On file, NPS, Midwest Archeological Center, Lincoln, Nebraska.

1996b *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes.* NPS, Washington, D.C.

1996c Trip Report, Archeological Collections at Herbert Hoover Birthplace National Memorial Site [sic], by William J. Hunt, Jr. Dated May 10, 1996. On file, NPS, Midwest Archeological Center, Lincoln, Nebraska.

1996d Trip Report, Archeological Investigations in the Vicinity of the Hoover Library, Herbert Hoover Birthplace National Memorial Site [sic] (HEHO)April 22-26, by William J. Hunt, Jr. Dated May 10, 1996. On file, NPS, Midwest Archeological Center, Lincoln, Nebraska.

1998 *Cultural Resource Management Guideline, NPS 28.* Washington, D.C.: NPS.

1999 Baseline Water Quality Data Inventory and Analysis. Herbert Hoover National Historic Site. NPS Water Resources Division, Fort Collins, CO. Technical Report NPS/NRWRD/NRTR-99/233. October.

2000a Management Policies 2001. U.S. Department of Interior, NPS. Washington DC. 137pp.

2000b Director's Order 28, Cultural Resources Management. U.S. Department of the Interior. Accessed on the Internet at http://data2.itc.nps.gov/npspolicy/DOrders.cfm.

2000c *Phase I Intensive Archaeological Investigation of Proposed Access to Buried Utilities at Herbert Hoover National Historic Site, City of West Branch, Cedar County, Iowa,* by Cynthia L. Peterson. Contract Completion Report 773. State Archaeologist of Iowa, Office of the State Archaeologists, University of Iowa, Iowa City.

2001 *Director's Order #12 and Handbook*. Washington, DC. Accessed on the Internet at http://www.nps.gov/policy/DOrder12.html.

2002 Herbert Hoover National Historic Site Emergency Operations Plan

2003a *Herbert Hoover National Historic Site Draft Stream Management Plan*.

2003b Prairie Management Plan, Herbert Hoover National Historic Site, September 30, 2003 [unsigned plan].

2003c Director's Orders 77-2, Floodplain Management. Accessed on the Internet at http:/data2.itc.nps.gov/npspolicy/DOrders.cfm

2004a *Herbert Hoover National Historic Site General Management Plan and Environmental Assessment*.

2004b Draft Engineering Report for Herbert Hoover National Historic Site Stream Restoration Project.

2004c NPS Public Use Statistics Office. Annual Visitation for Herbert Hoover National Historic Site. Accessed on the Internet at http://www2.nature.nps.gov/stats/.

2004d NPS Public Use Statistics Office. Economic Impacts of Visitor Spending by Park: Herbert Hoover National Historic Site. Accessed on the Internet at http://www2.nature.nps.gov/stats/.

2004e NPS Public Use Statistics Office. 10/157 Reporting. Accessed on the Internet at http://www2.nature.nps.gov/mpur/index.cfm

2004f Reference Manual #77. Accessed on the Internet at http://www.nature.nps.gov/rm77/Freshwater/Define.htm.

2004g NPS Herbert Hoover National Historic Site Park Website Accessed on the Internet at http://www.nps.gov/heho/index.htm.

2004h Notices Federal Register / Vol. 69, No. 148 / Tuesday, August 3, 2004.

2005a Money Generation Model 2 (MGM2). Accessed on the Internet at http://planning.nps.gov/mgm/mgm2.htm. 31 August.

2005b *Herbert Hoover National Historic Site Cultural Landscape Inventory Unit Summary and Site Plan.* National Park Service, Midwest Regional Office, Omaha, Nebraska.

2006a Final Engineering Report. Stream Management Plan. Stream Management Plan. Herbert Hoover National Historic Site. Prepared by Parsons for the National Park Service..

2006b Programmatic Agreement Between the National Park Service and the Iowa State Historic Preservation Office Regarding Hoover Creek Stream Management Plan and Environmental Impact Statement, Herbert Hoover National Historic Site, West Branch, Iowa. Signed April 18, 2006. Agreement on file at the National Park Service, Midwest Regional Office, Omaha, Nebraska.

Peterson, Daniel

2005 Peterson, Dan, Education Specialist, Herbert Hoover National Historic Site. personal communication 1-11-2005.

Presidential Avenue

2004 Herbert Hoover, 31st President, 1929-1933. Accessed on the Internet at http://www.presidentialavenue.com/hh.cfm

Rosgen, Dave

1996 Applied River Morphology. Wildland Hydrology. Pagosa Springs, Colorado.

Society of Ecological Restoration

2004 The SER International Primer on Ecological Restoration. Society for Ecological Restoration International Science & Policy Working Group. Accessed on the Internet at http://www.ser.org/content/ecological_restoration_primer.asp#3

Stravers, J.W., K.J. McKay, and T.W. McClenahan

2004 Avian surveys at Herbert Hoover National Historic Site. Heartland Network Inventory and Monitoring Program, Technical Report No. NPS/HTLN/HEHO/P2106020891. March 2004.

U.S. Census Bureau, U.S. Department of Commerce

2002 Summary Statistics by 2002 NAICS, Cedar County, Iowa. Accessed on the Internet at http://www.census.gov/econ/census02/data/ia/IA031.htm. 26 August.

U.S. Department of Agriculture (USDA)

1979 Soil Survey of Cedar County, Iowa.

2002 Census of Agriculture, Cedar County, Iowa. Accessed on the Internet at http://151.121.3.33:8080/Census/Pull_Data_Census. 31 August.

2005 Table of Prime Farmland, Cedar County, Iowa. Accessed on the Internet at ftp://pub.gis.iastate.edu/nrcs/ssurgo on 6/28/2005.

U.S. Environmental Protection Agency (EPA)

1999 Current National Recommended Water Quality Criteria. Accessed on the Internet at http://www.epa.gov/watersscience/criteria/wqcriteria.html.

2004 Stormwater Best Management Practice Design Guide: Volume 1 General Considerations. National Risk Management Research Laboratory Office of Research and Development. EPA/600/R-04/121. September.

2005 Water Quality Standards Database. Iowa Waterbody and Designated Use Data. Accessed on the Internet at http://oaspub.epa.gov/wqsi_wb_du.report_control.

U.S. Geological Survey (USGS)

1994 Flood Analysis, West Branch Wapsinonoc Creek Tributary. Herbert Hoover National Historic Site. West Branch, Iowa.

2005 Streamflow Data for Hoover Creek at Herbert Hoover National Historic Site, West Branch, Iowa. USGS 05464942. Accessed on the Internet at http://waterdata.usgs.gov/ia/nwis/dv/?site_no=05464942&PARAmeter_cd=00060

West Branch, Iowa

1993 City of West Branch Resolution 543 dated 10/19/1998.

2003 Inventory of Proposed Waterline Route, Report by William Wittaker for the City of West Branch, Iowa.

2004 City of West Branch, Iowa Website. Accessed on the Internet at http://www.westbranchiowa.org/index.html.

Wiesener, Cary

2005a Wiesner, Cary, Park Historian, Herbert Hoover National Historic Site. personal communication. 1-11-2005.

2005b Wiesner, Cary, Park Historian, Herbert Hoover National Historic Site. personal communication. 2-9-2005.

GLOSSARY

acre-foot – The volume of water required to cover one acre to a depth of one foot. One acre-foot is equal to 325,851 gallons.

active channel – The channel that continues to cut, surrounded by active floodplain and lying between the terrace banks. This channel carries the base flow and when full, defines bankfull flow.

active floodplain – A low, flat land surface outside of the active channel, but adjacent to it, that is inundated by high flow events once every two years, on average. This floodplain lies between the terrace banks.

agricultural runoff – Storm water that has contact with agricultural fields.

attenuate – To reduce in strength, effect, or volume.

bankfull discharge or bankfull stage – The rate of flow that is contained within a stream's banks, without overflow; most channels will contain the maximum discharge that occurs once each year.

breakout points – Areas along the stream where water may leave the channel due to low bank elevations or where there is a higher flowline.

cfs – cubic feet per second. The units of measure for reporting stream flow or discharge. A cubic foot of water passing a reference point.

channel – A natural or artificial waterway containing moving water.

channel capacity – the amount of water that can be detained within the banks of the stream without overflow on to the terrace or greater floodplain.

designated use – Within the context of state water quality standards, uses made of a water body for which water quality must be protected. Common designated uses are body-contact recreation, aquatic life support, public water supplies, and industrial and agricultural purposes.

detention – Holding water to allow the slow release of storm runoff into the stream channel.

discharge – Amount of water in a stream or other conduit that passes a given point during a given period of time.

E. coli – *Escherichia coli.* Microorganism that indicates the presence of pathogenic organisms from animal waste.

entrenchment – The act of stream incision; down-cutting.

erosion – detachment and movement of soil particles by water or wind.

fecal coliform – Microorganism that indicates the presence of animal waste.

floodplain – Lowland and relatively flat area adjacent to a stream that is periodically subject to flooding.

floodplain values – Beneficial attributes and uses of floodplains, including wildlife habitat, groundwater recharge, hydrologic balance/buffering of flood flows, maintenance of the channel's hydraulic integrity, outdoor education, and recreation.

geomorphology – The study of surface forms of the earth and the processes that developed those forms.

geotextile – A product used as a soil reinforcement agent and as a filter medium. It is made of synthetic fibers manufactured in a woven or loose nonwoven manner to form a blanket-like product.

groundwater recharge – Downward movement of water from the land surface into and through upper soil layers.

head cut – Stream bank retreats upslope due to erosion.

hydrology – The science of the waters of the Earth, their occurrence, circulation, and distribution, their chemical and physical properties, and their reaction with their environment.

hydraulic – Referring to water or other fluids in motion.

incised channel – A channel with a stream bed lower in elevation than its historic elevation in relation to the floodplain. Incising channels normally deepen at a faster rate than they widen.

infiltration – The movement of water through the soil surface and into the soil.

knickpoint – See head cut.

levee – A dike or embankment of earth or concrete that is used to prevent water from overflowing the stream channel during times of flooding.

mean annual flood – The arithmetic mean of the annual flood peaks. These flows have a recurrence interval of approximately 2.3 years.

meander – The winding section of a stream with two complete opposite bends.

overland flow – Runoff water that flows on the land surface rather than percolating into the ground.

Proper Functioning Condition – The condition of the stream in which energy dissipates, sediment is filtered, floodplain develops, floodwater is retained in channel, stream banks stabilize, so as to provide habitat and support biodiversity.

reach – A section of the stream, as defined by the user.

recurrence interval – One form of expressing the anticipated frequency or probability of a flood event. For example, a 20-year-event has a 0.05 probability of occurring in any given year; this should not be taken as an every 20 year event, as two such events may take place in rapid succession.

retention – a somewhat permanent holding of water; longer in duration than in detention.

revetment – Structures placed on banks in such a way as to absorb the energy of incoming water flow. They are usually built to preserve the existing riverside uses and to protect the slope. They may be either watertight, covering the slope completely, or porous, to allow water to filter through after the wave energy has dissipated. Revetments that are adequate under normal conditions may be damaged in severe runoff events, when the speed and carrying power of the rushing water increase to several times their normal rates. Revetments must be thus strong enough to resist the battering by water and debris.

riparian – Adjacent to stream or standing water.

riparian buffer – A vegetated are along the edge of the water, specifically designed to improve water quality and riparian stability.

riparian corridor – The area of the stream directly affected during normal stream flow, including active channel, active floodplain, and banks to the terrace, but not the terrace.

runoff – Water from precipitation or snow melt that flows over the land. It may include surface runoff, which does not infiltrate, and subsurface runoff, which infiltrates shallowly and continues to flow with a horizontal component.

scouring – The erosive removal or material from the stream channel or floodplain.

sinuosity – The natural meandering of a stream as it attains a reduced level of energy.

terrace – The upper elevation of land, outside of the active floodplain, but part of the stream corridor.

toe of bank – The base of an embankment.

watershed – The entire land mass that drains storm and groundwater into a specified stream. Groundwatershed encompasses a different area than the surface watershed, but for this plan, only surface watershed is considered.

This page intentionally left blank.

APPENDIX A: CONSULTATION CORRESPONDENCE

This page intentionally left blank.

STATE HISTORICAL SOCIETY of IOWA

A Division of the Iowa Department of Cultural Affairs

August 23, 2004

In reply refer to:
R&C#: 890516224

Bruce D. McKeeman, Superintendent
United States Department of the Interior
National Park Service
Herbert Hoover National Historic Site
P.O. Box 607
West Branch, Iowa 52358-0607

RE: NPS - CEDAR COUNTY - HERBERT HOOVER NATIONAL HISTORIC SITE – DEVELOPMENT OF A STREAM MANAGEMENT PLAN AND ENVIORNMENTAL IMPACT STATEMENT

Dear Mr. McKeeman,

Thank you for notifying our office about the above referenced proposed project. We understand that this project will be a federal undertaking for your agency, the National Park Service, and will need to comply with Sections 106 and 110 of the National Historic Preservation Act and with the National Environmental Policy Act.

We understand that a Stream Management Plan and a draft Enviornmental Impact Statement are currently being prepared for this undertaking. We look forward to consulting with you on whether any significant historic propertioes will be affected by this proposed undertaking. We will need the following types of information for our review:

- The Area of Potential Effect (APE) for this project needs to be adequately defined (36 CFR Part 800.16 (d)). We need a map with the proposed project area clearly demarcated. Also, we need a description of the proposed project activities for this undertaking.
- Information on what types of cultural resources are or may be located in the APE (36 CFR Part 800.4). Particularly, we need additional information on what types of background information have been examined to identify what types of historic properties are in the Area of Potential Effect that might be affected by the proposed undertaking. If no information is available on the property, your agency should consider whether an archaeological and architectural survey should be conducted in the Area of Potential Effect prior to any construction activities.
- The significance of the historic properties in the APE in consideration of the National Register of Historic Places Criteria.
- A determination from your agency of the undertaking's effects on historical properties within the APE (36 CFR Part 800.5).

We have made these comments and recommendations according to our responsibility defined by Federal law pertaining to the Section 106 process. Your agency does not have to follow our comments and recommendations to comply with the Section 106 process

600 EAST LOCUST STREET, DES MOINES, IA 50319-0290 P: (515) 281-5111

Please reference the Review and Compliance Number provided above in all future submitted correspondence to our office for this project. We look forward to further consulting with you on this undertaking. If you have any further questions, please feel free to contact us at the numbers provided below.

Sincerely,

Douglas W. Jones

Douglas W. Jones, Archaeologist
Historic Preservation Bureau
(515) 281-4358

cc: Rachel Franklin Weekley, National Historic Landmark Coordinator, NPS - Midwest Office

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT. CORPS OF ENGINEERS
CLOCK TOWER BUILDING - P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO
ATTENTION OF:

September 13, 2004

Planning, Programs, and
Project Management Division

Mr. Bruce McKeeman
Herbert Hoover National Historic Site
P.O. Box 607
West Branch, Iowa 52358-0607

Dear Mr. McKeeman:

I received your letter dated August 6, 2004, concerning initial consultation on the development of a stream management plan and Environmental Impact Statement (EIS) for Herbert Hoover National Historic Site. Rock Island District staff reviewed the information you provided and have the following comments:

a. Your proposal does not involve Rock Island District Corps of Engineers (Corps) administered land; therefore, no further Corps real estate coordination is necessary.

b. Any proposed placement of fill or dredged material into waters of the United States (including wetlands) requires Department of the Army (DA) authorization. We require additional details of your project before we can make a final determination. When detailed plans are available, please complete and submit the enclosed application packet to the Rock Island District for processing.

c. The Responsible Federal Agency should coordinate with Ms. Maria Pandullo, Iowa Historic Preservation Agency, ATTN: Review and Compliance Program, State Historical Society of Iowa, Capitol Complex, Des Moines, Iowa 50319 to determine impacts to historic properties.

d. The Rock Island Field Office of the U.S. Fish and Wildlife Service should be contacted to determine if any federally listed endangered species are being impacted and, if so, how to avoid or minimize impacts. The Rock Island Field Office address is: 4469 - 48th Avenue Court, Rock Island, Illinois 61201. Mr. Rick Nelson is the Field Supervisor. You can reach him by calling 309/793-5800.

e. The Iowa Emergency Management Division should be contacted to determine if the proposed project may impact areas designated as floodway. Mr. Dennis Harper is the Iowa State

Hazard Mitigation Team Leader. His address is: Hoover State Office Bldg., Level A, Des Moines, Iowa 50319. You can reach him by calling 515/281-3231.

No other concerns surfaced during our initial review. Thank you for early consultation. The Corps awaits the draft EIS. If you need more information, please call Dr. Sandra Brewer of our Economic and Environmental Analysis Branch, telephone 309/794-5171.

You may find additional information about the Corps' Rock Island District on our web site at **http://www.mvr.usace.army.mil**. To find out about other Districts within the Corps, you may visit web site: **http://www.usace.army.mil/divdistmap.html**.

Sincerely,

Kenneth A. Barr
Chief, Economic and Environmental
Analysis Branch

Enclosure

United States Department of the Interior
NATIONAL PARK SERVICE
HERBERT HOOVER NATIONAL HISTORIC SITE
P. O. BOX 607
WEST BRANCH, IOWA 52358-0607

IN REPLY REFER TO:

August 6, 2004

S7219(HEHO)

Mr. Kelly Stone, P.E.
Water Resources Division
Iowa Department of Natural Resources
Henry A. Wallace Bldg.
502 E. 9th Street
Des Moines, IA 50319-0034

Subject: Floodplain Management Consultation, Development of a Stream Management Plan and Environmental Impact Statement for Herbert Hoover National Historic Site

Dear Mr. Stone:

The purpose of this letter is to provide you with notice that the National Park Service is beginning the development of a Stream Management Plan and Environmental Impact Statement (Plan/EIS) for Herbert Hoover National Historic Site in West Branch, Iowa. The purpose of this Plan/EIS is to address resource issues within park boundaries associated with Hoover Creek and particularly to: 1) protect historic structures and cultural resources from frequent flood events, 2) restore the stream to a more historic appearance, and 3) improve natural stream function. The plan will also promote public involvement to improve watershed health and water quality in Hoover Creek.

Currently, the planning team is developing concepts for alternatives that meet the objectives and goals to the greatest extent possible. The alternatives will emphasize differing levels of flood protection and stream management tools and techniques. Alternatives to achieve the purpose and objectives of the proposed action will be developed during the scoping process.

A key goal for the National Park Service is to meet the mandate of the Organic Act, which established the National Park Service in 1916. The Organic Act states that the National Park Service must "conserve the scenery and the natural and historic objects and the wild life [in national parks] and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." Consistent with this mandate, important components of the plan will be to protect the park's core historic structures, cultural landscape, and natural resources.

This letter is the first step of consultation for this project to ensure that the planning effort adequately addresses Iowa Floodplain Management requirements related to the Plan/EIS. When the draft EIS is completed, a copy will be sent to you with an official transmittal letter requesting your review and comment.

We look forward to working cooperatively with you on the planning and implementation of this project. If you have any questions or desire additional information, please contact me at 319-643-2541.

Sincerely,

Bruce D. McKeeman
Superintendent

Cc: NPS-Midwest Regional Office (N. Chevance)
Parsons-Denver (J. Bryant)

United States Department of the Interior
NATIONAL PARK SERVICE
HERBERT HOOVER NATIONAL HISTORIC SITE
P. O. BOX 607
WEST BRANCH, IOWA 52358-0607

IN REPLY REFER TO:

August 6, 2004

S7219(HEHO)

Mayor, City of West Branch
P. O. Box 218
304 East Main
West Branch, IA 52358

Subject: Initial Consultation, Development of a Stream Management Plan and Environmental Impact Statement for Herbert Hoover National Historic Site

Dear Ms. Hatfield:

The purpose of this letter is to provide you with notice that the National Park Service is beginning the development of a Stream Management Plan and Environmental Impact Statement (Plan/EIS) for Herbert Hoover National Historic Site. The purpose of this Plan/EIS is to address resource issues within park boundaries associated with Hoover Creek and particularly to: 1) protect historic structures and cultural resources from frequent flood events, 2) restore the stream to a more historic appearance, and 3) improve natural stream function. The plan will also promote public involvement to improve watershed health and water quality in Hoover Creek.

Currently, the planning team is developing concepts for alternatives that meet the objectives and goals to the greatest extent possible. The alternatives will emphasize differing levels of flood protection and stream management tools and techniques. Alternatives to achieve the purpose and objectives of the proposed action will be developed during the scoping process.

A key goal for the National Park Service is to meet the mandate of the Organic Act, which established the National Park Service in 1916. The Organic Act states that the National Park Service must "conserve the scenery and the natural and historic objects and the wild life [in national parks] and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." Consistent with this mandate, important components of the plan will protect the park's core historic structures, cultural landscape, and associated resources.

This letter is the first step in the consultation process for this project to ensure that the planning effort adequately addresses your concerns and requirements related to the Plan/EIS. As the planning effort continues, you can expect to receive more information from the park, as well as invitations to public meetings and workshops. When the draft EIS is complete, a copy will be sent to you with an official transmittal letter requesting your review and comment.

We look forward to working cooperatively with you on the planning and implementation of this project. If you have any questions or desire additional information, please contact me at 319-643-2541.

Sincerely,

Bruce D. McKeeman
Superintendent

Cc: NPS-Midwest Regional Office (N. Chevance)
Parsons-Denver (J. Bryant)

United States Department of the Interior
NATIONAL PARK SERVICE
HERBERT HOOVER NATIONAL HISTORIC SITE
P. O. BOX 607
WEST BRANCH, IOWA 52358-0607

IN REPLY REFER TO:

August 6, 2004

S7219(HEHO)

Mr. Mark Fehseke, District Conservationist
Natural Resources Conservation Service
U.S. Department of Agriculture
205 West South Street, Suite 3
Tipton, IA 52772

Subject: Initial Consultation, Development of a Stream Management Plan and Environmental Impact Statement for Herbert Hoover National Historic Site

Dear Mr. Fehseke:

The purpose of this letter is to provide you with notice that the National Park Service is beginning the development of a Stream Management Plan and Environmental Impact Statement (Plan/EIS) for Herbert Hoover National Historic Site in West Branch, Iowa. The purpose of this Plan/EIS is to address resource issues within park boundaries associated with Hoover Creek and particularly to: 1) protect historic structures and cultural resources from frequent flood events, 2) restore the stream to a more historic appearance, and 3) improve natural stream function. The plan will also promote public involvement to improve watershed health and water quality in Hoover Creek.

Currently, the planning team is developing concepts for alternatives that meet the objectives and goals to the greatest extent possible. The alternatives will emphasize differing levels of flood protection and stream management tools and techniques. Alternatives to achieve the purpose and objectives of the proposed action will be developed during the scoping process.

A key goal for the National Park Service is to meet the mandate of the Organic Act, which established the National Park Service in 1916. The Organic Act states that the National Park Service must "conserve the scenery and the natural and historic objects and the wild life [in national parks] and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." Consistent with this mandate, important components of the plan will protect the park's core historic structures, cultural landscape, and associated resources.

This letter is the first step in the consultation process for this project to ensure that the planning effort adequately addresses your concerns and requirements related to the Plan/EIS. As the planning effort continues, you can expect to receive more information from the park, as well as invitations to public meetings and workshops. When the draft EIS is complete, a copy will be sent to you with an official transmittal letter requesting your review and comment.

We look forward to working cooperatively with you on the planning and implementation of this project. If you have any questions or desire additional information, please contact me at 319-643-2541.

Sincerely,

Bruce D. McKeeman
Superintendent

Cc: NPS-Midwest Regional Office (N. Chevance)
Parsons-Denver (J. Bryant)

United States Department of the Interior
NATIONAL PARK SERVICE
HERBERT HOOVER NATIONAL HISTORIC SITE
P. O. BOX 607
WEST BRANCH, IOWA 52358-0607

IN REPLY REFER TO:

August 6, 2004

S7219(HEHO)

Mr. Rick Inglis
National Park Service
Water Resources Division
1201 Oakridge Drive
Fort Collins, CO 80252

Subject: Initial Consultation, Development of a Stream Management Plan and Environmental Impact Statement for Herbert Hoover National Historic Site

Dear Mr. Inglis:

The purpose of this letter is to provide you with notice that the National Park Service is beginning the development of a Stream Management Plan and Environmental Impact Statement (Plan/EIS) for Herbert Hoover National Historic Site in West Branch, Iowa. The purpose of this Plan/EIS is to address resource issues within park boundaries associated with Hoover Creek and particularly to: 1) protect historic structures and cultural resources from frequent flood events, 2) restore the stream to a more historic appearance, and 3) improve natural stream function. The plan will also promote public involvement to improve watershed health and water quality in Hoover Creek.

Currently, the planning team is developing concepts for alternatives that will emphasize differing levels of flood protection and stream management tools and techniques. Alternatives to protect the park's core historic structures, cultural landscape, and associated resources will be developed during the scoping process. This letter is the first step in the consultation process for this project to ensure that the planning effort adequately addresses NPS WRD requirements related to the Plan/EIS. As the planning effort continues, you can expect to receive more information from the park, as well as invitations to public meetings and workshops. When the draft EIS is complete, a copy will be sent to you with an official transmittal letter requesting your review and comment.

We look forward to working cooperatively with you on the planning and implementation of this project. If you have any questions or desire additional information, please contact me at 319-643-2541.

Sincerely,

Bruce D. McKeeman
Superintendent
Cc: NPS-Midwest Regional Office (N. Chevance)

United States Department of the Interior
NATIONAL PARK SERVICE
HERBERT HOOVER NATIONAL HISTORIC SITE
P. O. BOX 607
WEST BRANCH, IOWA 52358-0607

IN REPLY REFER TO:

TAKE PRIDE IN AMERICA

August 6, 2004

S7219(HEHO)

Dr. Mary Skopec, Coordinator
Water Quality Monitoring, Geological Survey Bureau
Iowa Department of Natural Resources
109 Trowbridge Hall UI
Iowa City, IA 52340

Subject: Initial Consultation, Development of a Stream Management Plan and Environmental Impact Statement for Herbert Hoover National Historic Site

Dear Dr. Skopec:

The purpose of this letter is to provide you with notice that the National Park Service is beginning the development of a Stream Management Plan and Environmental Impact Statement (Plan/EIS) for Herbert Hoover National Historic Site in West Branch, Iowa. The purpose of this Plan/EIS is to address resource issues within park boundaries associated with Hoover Creek and particularly to: 1) protect historic structures and cultural resources from frequent flood events, 2) restore the stream to a more historic appearance, and 3) improve natural stream function. The plan will also promote public involvement to improve watershed health and water quality in Hoover Creek.

Currently, the planning team is developing concepts for alternatives that meet the objectives and goals to the greatest extent possible. The alternatives will emphasize differing levels of flood protection and stream management tools and techniques. Alternatives to achieve the purpose and objectives of the proposed action will be developed during the scoping process.

A key goal for the National Park Service is to meet the mandate of the Organic Act, which established the National Park Service in 1916. The Organic Act states that the National Park Service must "conserve the scenery and the natural and historic objects and the wild life [in national parks] and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." Consistent with this mandate, important components of the plan will protect the park's core historic structures, cultural landscape, and associated resources.

This letter is the first step in the consultation process for this project to ensure that the planning effort adequately addresses your concerns and requirements related to the Plan/EIS. As the planning effort continues, you can expect to receive more information from the park, as well as invitations to public meetings and workshops. When the draft EIS is complete, a copy will be sent to you with an official transmittal letter requesting your review and comment.

We look forward to working cooperatively with you on the planning and implementation of this project. If you have any questions or desire additional information, please contact me at 319-643-2541.

Sincerely,

Bruce D. McKeeman
Superintendent

Cc: NPS-Midwest Regional Office (N. Chevance)
Parsons-Denver (J. Bryant)

United States Department of the Interior

NATIONAL PARK SERVICE

HERBERT HOOVER NATIONAL HISTORIC SITE
P.O. BOX 607
WEST BRANCH, IOWA 52358-0607

IN REPLY REFER TO:

August 6, 2004

S7219(HEHO)

State Historic Preservation Officer
State Historical Society of Iowa
State of Iowa Historical Building
600 East Locust
Des Moines, IA 50319-0290

Subject: Section 106 Consultation, Development of a Stream Management Plan and Environmental Impact Statement for Herbert Hoover National Historic Site

Dear Ms. Anita Walker:

The purpose of this letter is to provide you with notice that the National Park Service is beginning the development of a Stream Management Plan and Environmental Impact Statement (Plan/EIS) for Herbert Hoover National Historic Site in West Branch, Iowa.

The purpose of this Plan/EIS is to address resource issues within park boundaries associated with Hoover Creek and particularly to: 1) increase flood protection for historic structures and cultural resources from frequent flood events, 2) restore the stream to a more historic appearance, and 3) improve natural stream function. The plan would also promote public involvement in improving watershed health and water quality in Hoover Creek.

We believe that implementation of the plan would have the potential to affect properties included on or that may be eligible for inclusion on the National Register. Therefore, we are initiating consultation with your office in accordance with 36 CFR 800 and the 1995 Servicewide Programmatic Agreement among your office, the Advisory Council on Historic Preservation, and the National Park Service.

This letter is also to notify your office that we plan to use this EIS to accomplish compliance for both Section 106 and the National Environmental Policy Act as described in 36 CFR 800.8 (a-c). The EIS will provide detailed descriptions of alternative programs intended to improve flood protection, stream function and, as required by law, a no-action alternative. The EIS also will analyze the potential impacts associated with possible implementation of each alternative and will describe the rationale for choosing the preferred alternative. These details will be reiterated in a Section 106 Summary in the EIS, in addition to a full description of mitigation measures that would help avoid adverse effects on historic and cultural resources.

The National Park Service is aware that other groups may have concerns related to management actions at Herbert Hoover National Historic Site. Therefore, consultation has been initiated with groups that have expressed an interest in the park. This consultation is intended to ensure that mutually held goals for management of important natural and cultural resources are met.

As soon as the draft EIS is complete, we will send it to you for your review, comment, and concurrence that the Section 106 process has been completed. We look forward to your participation and input on the planning process. We believe that your ongoing participation will result in better planning for cultural resources management and will help ensure that cultural resources are adequately considered during preparation of the plan and the accompanying EIS.

As required by 36 CFR 800, and as indicated above, the Advisory Council on Historic Preservation has been notified regarding inclusion of Section 106 compliance within the EIS process.

If you have any questions or desire additional information, please contact me at 319-643-2541.

Sincerely,

Bruce D. McKeeman
Superintendent

Cc: NPS-Midwest Regional Office (N. Chevance)
Parsons-Denver (J. Bryant and D. Rhodes)

United States Department of the Interior
NATIONAL PARK SERVICE
HERBERT HOOVER NATIONAL HISTORIC SITE
P. O. BOX 607
WEST BRANCH, IOWA 52358-0607

IN REPLY REFER TO:

August 6, 2004

S7219(HEHO)

Dr. James Cottingham, Clerk
West Branch Friends Meeting (Conservative)
317 North Sixth Street
West Branch, Iowa 52358

Subject: Initial Consultation, Development of a Stream Management Plan and Environmental Impact Statement for Herbert Hoover National Historic Site

Dear Dr. Cottingham:

The purpose of this letter is to provide you and the Friends Meeting advance notice that the National Park Service is beginning the development of a Stream Management Plan and Environmental Impact Statement (Plan/EIS) for Herbert Hoover National Historic Site in West Branch, Iowa. The purpose of this Plan/EIS is to address resource issues within park boundaries associated with Hoover Creek and particularly to: 1) protect historic structures and cultural resources from frequent flood events, 2) restore the stream to a more historic appearance, and 3) improve natural stream function. The plan will also promote public involvement to improve watershed health and water quality in Hoover Creek.

We recognize that protection of resources associated with President Hoover and Quaker heritage in West Branch is important to you. Therefore, we are initiating consultation with your organization as we begin planning for long-term management of Hoover Creek. As the planning effort continues, you can expect to receive more information from the park, as well as invitations to public meetings and workshops. As soon as the draft EIS is complete, we will send it to you for your review and comment.

We believe that your participation will result in better planning for resource management, and will help ensure that cultural and natural resources valued by your organization are adequately considered during the planning process and in preparation of the accompanying environmental impact statement. We look forward to receiving your input on our plans and any concerns you have about the project. We would be pleased to discuss this project further, either by telephone or in a meeting.

If you have any questions or desire additional information, please contact me by telephone at 319-643-2541, or by mail at 110 Parkside Drive, P.O. Box 607, West Branch, IA 52358-0607

Sincerely,

Bruce D. McKeeman
Superintendent

Cc: NPS-Midwest Regional Office (N. Chevance)
Parsons-Denver (J. Bryant and D. Rhodes)

United States Department of the Interior

NATIONAL PARK SERVICE

HERBERT HOOVER NATIONAL HISTORIC SITE
P. O. BOX 607
WEST BRANCH, IOWA 52358-0607

IN REPLY REFER TO:

August 6, 2004

S7219(HEHO)

Subject: Initial Consultation, Development of a Stream Management Plan and Environmental Impact Statement for Herbert Hoover National Historic Site

Rev. Clarence Mercer
Friends Church
116 N. Downey Street
West Branch, Iowa 52358

Dear Reverend Mercer:

The purpose of this letter is to provide you and your congregation advance notice that the National Park Service is beginning the development of a Stream Management Plan and Environmental Impact Statement (Plan/EIS) for Herbert Hoover National Historic Site in West Branch, Iowa. The purpose of this Plan/EIS is to address resource issues within park boundaries associated with Hoover Creek and particularly to: 1) protect historic structures and cultural resources from frequent flood events, 2) restore the stream to a more historic appearance, and 3) improve natural stream function. The plan will also promote public involvement to improve watershed health and water quality in Hoover Creek.

We recognize that protection of resources associated with President Hoover and Quaker heritage in West Branch is important to you. Therefore, we are initiating consultation with your organization as we begin planning for long-term management of Hoover Creek. As the planning effort continues, you can expect to receive more information from the park, as well as invitations to public meetings and workshops. As soon as the draft EIS is complete, we will send it to you for your review and comment.

We believe that your participation will result in better planning for resource management, and will help ensure that cultural and natural resources valued by your organization are adequately considered during the planning process and in preparation of the accompanying environmental impact statement. We look forward to receiving your input on our plans and any concerns you have about the project. We would be pleased to discuss this project further, either by telephone or in a meeting.

If you have any questions or desire additional information, please contact me by telephone at 319-643-2541, or by mail at 110 Parkside Drive, P.O. Box 607, West Branch, IA 52358-0607

Sincerely,

Bruce D. McKeeman
Superintendent

Cc: NPS-Midwest Regional Office (N. Chevance)
Parsons-Denver (J. Bryant and D. Rhodes)

United States Department of the Interior
NATIONAL PARK SERVICE
HERBERT HOOVER NATIONAL HISTORIC SITE
P. O. BOX 607
WEST BRANCH, IOWA 52358-0607

IN REPLY REFER TO:

August 6, 2004

S7219(HEHO)

Mr. Don Klima
Advisory Council on Historic Preservation
Old Post Office Building
1100 Pennsylvania Avenue, NW, Suite 803
Washington, DC 20004

Subject: Section 106 Consultation, Development of a Stream Management Plan and Environmental Impact Statement for Herbert Hoover National Historic Site

Dear Mr. Klima:

The purpose of this letter is to provide you with notice that the National Park Service is beginning the development of a Stream Management Plan and Environmental Impact Statement (Plan/EIS) for Herbert Hoover National Historic Site in West Branch, Iowa.

The purpose of this Plan/EIS is to address resource issues within the park boundaries associated with Hoover Creek and particularly to: 1) protect historic structures and cultural resources from frequent flood events, 2) restore the stream to a more historic appearance, and 3) improve natural stream function. The plan will also promote public involvement to improve watershed health and water quality in Hoover Creek.

We believe that implementation of the plan would have the potential to affect properties included on or that may be eligible for inclusion on the National Register of Historic Places. Therefore, we would like to invite your office to participate in the development of this planning effort in accordance with 36 CFR 800, and the 1995 Servicewide Programmatic Agreement among your office, the National Conference of State Historic Preservation Officers, and the National Park Service.

This letter is also to notify your office that we plan to use this EIS to accomplish compliance for both Section 106 and the National Environmental Policy Act, including public involvement, as described in 36 CFR 800.8 (a-c). The EIS will provide detailed descriptions of alternative programs intended to improve flood protection, stream function and, as required by law, a no-action alternative. The EIS also will analyze the potential impacts associated with possible implementation of each alternative and will describe the rationale for choosing the preferred alternative. These details will be reiterated in a Section 106 Summary in the EIS, in addition to a full description of mitigation measures that would help avoid adverse effects on historic and cultural resources.

The National Park Service is aware that other groups may have concerns related to management actions at Herbert Hoover National Historic Site. Therefore, consultation has been initiated with groups that have expressed an interest in the park. This consultation is intended to ensure that mutually held goals for management of important natural and cultural resources are met.

As soon as the EIS is completed, we will send it to you for your review, comment, and concurrence that the Section 106 process has been completed. We look forward to your participation and input on the planning process. We believe that your ongoing participation will result in better planning for cultural resources management and will help ensure that cultural resources are adequately considered during preparation of the plan and the accompanying EIS.

If you have any questions or desire additional information, please contact me at 319-643-2541.

Sincerely,

Bruce D. McKeeman
Superintendent

Cc: NPS-Midwest Regional Office (N. Chevance)
Parsons-Denver (J. Bryant and D. Rhodes)

United States Department of the Interior
NATIONAL PARK SERVICE
HERBERT HOOVER NATIONAL HISTORIC SITE
P. O. BOX 607
WEST BRANCH, IOWA 52358-0607

IN REPLY REFER TO:

August 6, 2004

S7219(HEHO)

Honorable Jon E. Bell
Chairman, Cedar County Board of Supervisors
400 Cedar Street
Tipton, IA 52772

Subject: Initial Consultation, Development of a Stream Management Plan and Environmental Impact Statement for Herbert Hoover National Historic Site

Dear Mr. Bell:

The purpose of this letter is to provide you with notice that the National Park Service is beginning the development of a Stream Management Plan and Environmental Impact Statement (Plan/EIS) for Herbert Hoover National Historic Site. The purpose of this Plan/EIS is to address resource issues within park boundaries associated with Hoover Creek and particularly to: 1) protect historic structures and cultural resources from frequent flood events, 2) restore the stream to a more historic appearance, and 3) improve natural stream function. The plan will also promote public involvement to improve watershed health and water quality in Hoover Creek.

Currently, the planning team is developing concepts for alternatives that meet the objectives and goals to the greatest extent possible. The alternatives will emphasize differing levels of flood protection and stream management tools and techniques. Alternatives to achieve the purpose and objectives of the proposed action will be developed during the scoping process.

A key goal for the National Park Service is to meet the mandate of the Organic Act, which established the National Park Service in 1916. The Organic Act states that the National Park Service must "conserve the scenery and the natural and historic objects and the wild life [in national parks] and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." Consistent with this mandate, important components of the plan will protect the park's core historic structures, cultural landscape, and associated resources.

This letter is the first step in the consultation process for this project to ensure that the planning effort adequately addresses your concerns and requirements related to the Plan/EIS. As the planning effort continues, you can expect to receive more information from the park, as well as invitations to public meetings and workshops. When the draft EIS is complete, a copy will be sent to you with an official transmittal letter requesting your review and comment.

We look forward to working cooperatively with you on the planning and implementation of this project. If you have any questions or desire additional information, please contact me at 319-643-2541.

Sincerely,

Bruce D. McKeeman
Superintendent

Cc: NPS-Midwest Regional Office (N. Chevance)
Parsons-Denver (J. Bryant)

United States Department of the Interior
NATIONAL PARK SERVICE
HERBERT HOOVER NATIONAL HISTORIC SITE
P. O. BOX 607
WEST BRANCH, IOWA 52358-0607

IN REPLY REFER TO:

August 6, 2004

S7219(HEHO)

Pat Forsythe, Executive Director
Herbert Hoover Presidential Library Association
302 Parkside Drive
West Branch, IA 52358

Subject: Development of a Stream Management Plan and Environmental Impact Statement for Herbert Hoover National Historic Site

Dear Ms. Forsythe:

The purpose of this letter is to provide you with notice that the National Park Service is beginning the development of a Stream Management Plan and Environmental Impact Statement (Plan/EIS) for Herbert Hoover National Historic Site. The purpose of this Plan/EIS is to address resource issues within the park boundaries associated with Hoover Creek and particularly to: 1) protect historic structures and cultural resources from frequent flood events, 2) restore the stream to a more historic appearance, and 3) improve natural stream function. The plan will also promote public involvement to improve watershed health and water quality in Hoover Creek.

We recognize the importance of the Herbert Hoover Presidential Library-Museum and area resources associated with President Hoover and share your concerns for preservation of these valuable national assets. Therefore, we are initiating consultation with your organization as we begin planning for long-term management of Hoover Creek. As the planning effort continues, you can expect to receive more information from the park, as well as invitations to public meetings and workshops. As soon as the draft EIS is complete, we will send it to you for your review and comment.

We look forward to your participation and input on the planning process. We believe that your ongoing participation will result in better planning for management of the park, and will help ensure that all of the critical resources of the Hoover Complex are adequately considered during preparation of the plan and the accompanying EIS.

If you have any questions or desire additional information, please contact me at 319-643-2541.

Sincerely,

Bruce D. McKeeman
Superintendent

Cc: NPS-Midwest Regional Office (N. Chevance)
Parsons-Denver (J. Bryant and D. Rhodes)

United States Department of the Interior
NATIONAL PARK SERVICE
HERBERT HOOVER NATIONAL HISTORIC SITE
P. O. BOX 607
WEST BRANCH, IOWA 52358-0607

IN REPLY REFER TO:

August 6, 2004

S7219(HEHO)

Subject: Initial Consultation, Development of a Stream Management Plan and Environmental Impact Statement for Herbert Hoover National Historic Site

Mr. Tim Walch, Director
Herbert Hoover Presidential Library-Museum
210 Parkside Drive
West Branch, IA 52358

Dear Mr. Walch:

The purpose of this letter is to provide you with notice that the National Park Service is beginning the development of a Stream Management Plan and Environmental Impact Statement (Plan/EIS) for Herbert Hoover National Historic Site. The purpose of this Plan/EIS is to address resource issues within park boundaries associated with Hoover Creek and particularly to: 1) protect historic structures and cultural resources from frequent flood events, 2) restore the stream to a more historic appearance, and 3) improve natural stream function. The plan will also promote public involvement to improve watershed health and water quality in Hoover Creek.

We recognize the importance of the Herbert Hoover Presidential Library-Museum and area resources associated with President Hoover and share your concerns for preservation of these valuable national assets. Therefore, we are initiating consultation with your organization as we begin planning for long-term management of Hoover Creek. As the planning effort continues, you can expect to receive more information from the park, as well as invitations to public meetings and workshops. As soon as the draft EIS is complete, we will send it to you for your review and comment.

We look forward to your participation and input on the planning process. We believe that your ongoing participation will result in better planning for management of the park, and will help ensure that all of the critical resources of the Hoover Complex are adequately considered during preparation of the plan and the accompanying EIS.

If you have any questions or desire additional information, please contact me at 319-643-2541.

Sincerely,

Bruce D. McKeeman
Superintendent

Cc: NPS-Midwest Regional Office (N. Chevance)
Parsons-Denver (J. Bryant and D. Rhodes)

United States Department of the Interior
NATIONAL PARK SERVICE
HERBERT HOOVER NATIONAL HISTORIC SITE
P. O. BOX 607
WEST BRANCH, IOWA 52358-0607

IN REPLY REFER TO:

August 6, 2004

S7219(HEHO)

Mr. Rob Middlemis-Brown, District Chief
U.S. Geologic Survey - WRD
400 South Clinton Street
Iowa City, IA 52344

Subject: Initial Consultation, Development of a Stream Management Plan and Environmental Impact Statement for Herbert Hoover National Historic Site

Dear Mr. Middlemis-Brown:

The purpose of this letter is to provide you with notice that the National Park Service is beginning the development of a Stream Management Plan and Environmental Impact Statement (Plan/EIS) for Herbert Hoover National Historic Site in West Branch, Iowa. The purpose of this Plan/EIS is to address resource issues within park boundaries associated with Hoover Creek and particularly to: 1) protect historic structures and cultural resources from frequent flood events, 2) restore the stream to a more historic appearance, and 3) improve natural stream function. The plan will also promote public involvement to improve watershed health and water quality in Hoover Creek.

Currently, the planning team is developing concepts for alternatives that meet the objectives and goals to the greatest extent possible. The alternatives will emphasize differing levels of flood protection and stream management tools and techniques. Alternatives to achieve the purpose and objectives of the proposed action will be developed during the scoping process.

A key goal for the National Park Service is to meet the mandate of the Organic Act, which established the National Park Service in 1916. The Organic Act states that the National Park Service must "conserve the scenery and the natural and historic objects and the wild life [in national parks] and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." Consistent with this mandate, important components of the plan will protect the park's core historic structures, cultural landscape, and associated resources.

This letter is the first step in the consultation process for this project to ensure that the planning effort adequately addresses your concerns and requirements related to the Plan/EIS. As the planning effort continues, you can expect to receive more information from the park, as well as invitations to public meetings and workshops. When the draft EIS is complete, a copy will be sent to you with an official transmittal letter requesting your review and comment.

We look forward to working cooperatively with you on the planning and implementation of this project. If you have any questions or desire additional information, please contact me at 319-643-2541.

Sincerely,

Bruce D. McKeeman
Superintendent

Cc: NPS-Midwest Regional Office (N. Chevance)
Parsons-Denver (J. Bryant)

United States Department of the Interior
NATIONAL PARK SERVICE
HERBERT HOOVER NATIONAL HISTORIC SITE
P. O. BOX 607
WEST BRANCH, IOWA 52358-0607

IN REPLY REFER TO:

August 6, 2004

S7219(HEHO)

Mr. Richard Nelson, Field Supervisor
U.S. Fish and Wildlife Service
4469 48th Avenue Court
Rock Island, IL 61201

Subject: Section 7 Consultation, Development of a Stream Management Plan and Environmental Impact Statement for Herbert Hoover National Historic Site

Dear Mr. Nelson:

The purpose of this letter is to provide you with notice that the National Park Service is beginning the development of a Stream Management Plan and Environmental Impact Statement (Plan/EIS) for Herbert Hoover National Historic Site in West Branch, Iowa. The purpose of this Plan/EIS is to address resource issues within park boundaries associated with Hoover Creek and particularly to: 1) protect historic structures and cultural resources from frequent flood events, 2) restore the stream to a more historic appearance, and 3) improve natural stream function. The plan will also promote public involvement to improve watershed health and water quality in Hoover Creek.

Currently, the team is developing concepts for alternatives that meet the plan objectives and goals to the greatest extent possible. The alternatives will emphasize differing levels of flood protection and stream management tools and techniques. Alternatives to achieve the purpose and objectives of the proposed action will be developed during the scoping process.

A key goal for the National Park Service is to meet the mandate of the Organic Act, which established the National Park Service in 1916. The Organic Act states that the National Park Service must "conserve the scenery and the natural and historic objects and the wild life [in national parks] and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." Consistent with this mandate, a part of the plan will identify and implement measures to protect any listed species that occur in the project area.

In order to meet our Endangered Species Act (ESA) Section 7 consultation requirements for the EIS, we respectfully request that you provide us with the current listing and locations of endangered, threatened, proposed and candidate species, and their associated critical habitats specific to Herbert Hoover National Historic Site and lands immediately adjacent to the park in Cedar County, Iowa.

This letter is the first step in the consultation process for this project to ensure that the planning effort adequately addresses ESA Section 7 requirements related to the Plan/EIS. When the draft EIS is complete, a copy will be sent to you with an official transmittal letter requesting your review and comment.

We look forward to working cooperatively with you on the planning and implementation of this project. If you have any questions or desire additional information, please contact me at 319-643-2541.

Sincerely,

Bruce D. McKeeman
Superintendent

Cc: NPS-Midwest Regional Office (N. Chevance)
Parsons-Denver (J. Bryant)

United States Department of the Interior
NATIONAL PARK SERVICE
HERBERT HOOVER NATIONAL HISTORIC SITE
P. O. BOX 607
WEST BRANCH, IOWA 52358-0607

IN REPLY REFER TO:

August 6, 2004

S7219(HEHO)

Mr. Ken Barr, P.E.
U.S. Army Engineer District, Rock Island
Clock Tower Building, Office PM-A
P.O. Box 2004
Rock Island, IL 61204-2004

Subject: Initial Consultation, Development of a Stream Management Plan and Environmental Impact Statement for Herbert Hoover National Historic Site

Dear Mr. Barr:

The purpose of this letter is to provide you with notice that the National Park Service is beginning the development of a Stream Management Plan and Environmental Impact Statement (Plan/EIS) for Herbert Hoover National Historic Site in West Branch, Iowa. The purpose of this Plan/EIS is to address resource issues within park boundaries associated with Hoover Creek and particularly to: 1) protect historic structures and cultural resources from frequent flood events, 2) restore the stream to a more historic appearance, and 3) improve natural stream function. The plan will also promote public involvement to improve watershed health and water quality in Hoover Creek.

Currently, the planning team is developing concepts for alternatives that meet the objectives and goals to the greatest extent possible. The alternatives will emphasize differing levels of flood protection and stream management tools and techniques. Alternatives to achieve the purpose and objectives of the proposed action will be developed during the scoping process. Although the creek is not navigable, we anticipate that the proposed actions will have effects on waters of the United States and may require permit(s) from your agency.

A key goal for the National Park Service is to meet the mandate of the Organic Act, which established the National Park Service in 1916. The Organic Act states that the National Park Service must "conserve the scenery and the natural and historic objects and the wild life [in national parks] and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." Consistent with this mandate, important components of the plan will protect the park's core historic structures, cultural landscape, and natural resources.

This letter is the first step in the consultation process for this project to ensure that the planning effort adequately addresses U.S. Army Corps of Engineers' requirements related to the Plan/EIS. As the planning effort continues, you can expect to receive more information from the park, as well as invitations to public meetings and workshops. When the draft EIS is complete, a copy will be sent to you with an official transmittal letter requesting your review and comment.

We look forward to working cooperatively with you on the planning and implementation of this project. If you have any questions or desire additional information, please contact me at 319-643-2541.

Sincerely,

Bruce D. McKeeman
Superintendent

Cc: NPS-Midwest Regional Office (N. Chevance)
Parsons-Denver (J. Bryant)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Rock Island Field Office
4469 48th Avenue Court
Rock Island, Illinois 61201
Phone: (309) 793-5800 Fax: (309) 793-5804

IN REPLY REFER TO:

FWS/RIFO

November 2, 2005

Mr. Ernest Quintana
Regional Director, National Park Service
Midwest Region
601 Riverfront Drive
Omaha, Nebraska 68102-4226

Dear Mr. Quintana:

This is in response to your letter and accompanying Environmental Impact Statement (EIS) dated September 15, 2005, regarding the stream management plan at the Herbert Hoover National Historic Site, in Cedar County, Iowa.

According to the EIS, the proposed project site does not contain any remnant prairie areas, only restored prairie which is not suitable habitat for the western prairie fringed orchid *(Platanthera praeclara)* or the prairie bush clover *(Lespedeza leptostachya)*. The project area also contains no known bald eagle *(Haliaeetus leucocephalus)* nests or roosting areas.

Based on your description of the project area, we concur that the proposed project will have no effect on federally listed or candidate species, and designated and proposed critical habitat. This precludes the need for further action on this project as required under Section 7 of the Endangered Species Act of 1973, as amended. If project plans change or portions of the proposed project were not evaluated, it is our recommendation that the changes be submitted for our review.

The above comments are provided in accordance with the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq).

If you have any questions regarding our comments, please contact Kristen Lundh of my staff at (309) 793-5800 ext. 215.

Sincerely,

Richard C. Nelson

United States Department of the Interior

U. S. GEOLOGICAL SURVEY
Iowa Water Science Center
P.O. Box 1230
Iowa City, Iowa 52244
319-337-4191

November 18, 2005

Stream EIS
Herbert Hoover Historical Site
P.O. Box 607
West Branch, IA 52358

Subject: Comments on Draft Environmental Impact Statement for the Stream Management Plan

The United States Geological Survey Water Science Center in Iowa City, Iowa has reviewed the subject report in regards to the hydrologic aspects of the Draft Environmental Impact Statement. The technical review included a analysis of all hydrologic information (both water quantity and quality) included in the report as background information, hydrologic impacts of each of the five action alternatives, and hydrologic features within the report's sections on the "affected environment", "environmental conditions", and appendices.

The United States Geological Survey, to the extent of the agency's knowledge regarding the hydrologic conditions and impacts, finds the information presented in the report to be complete and accurate. The hydrologic information contained in the report is in agreement with the known hydrologic conditions of the site and consistent with the current scientific understanding of the possible hydrologic impacts associated with the implementation of the five identified action alternatives.

If you have any questions or comments regarding our review, please contact me at 319-358-3600.

Sincerely,

Rob Middlemis-Brown
Center Director

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT. CORPS OF ENGINEERS
CLOCK TOWER BUILDING - P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

October 4, 2005

REPLY TO
ATTENTION OF:

Planning, Programs, and
Project Management Division

Mr. Bruce McKeeman
Superintendent
Herbert Hoover National Historic Site
P.O. Box 607
West Branch, Iowa 52358-0607

Dear Mr. McKeeman:

I received your letter dated September 15, 2005, requesting comments regarding the *Draft Hoover Creek Stream Management Plan and Environmental Impact Statement*. Rock Island District staff reviewed the information you provided and have the following comments:

a. Your proposal does not involve Rock Island District Corps of Engineers (Corps) administered land; therefore, no further Rock Island District Corps real estate coordination is necessary.

b. As you have acknowledged in your September 15, 2005 letter, any proposed placement of fill or dredged material into waters of the United States (including wetlands) requires Department of the Army (DA) authorization. We require additional details of your project before we can make a final determination. When detailed plans are available, please complete and submit the enclosed application packet to the Rock Island District for processing. If you have any questions regarding permit requirements under Section 404 of the Clean Water Act, please contact Mr. Neal Johnson of our Regulatory Branch. You may reach Mr. Johnson by writing to our address above, ATTN: Regulatory Branch (Neal Johnson), or by telephoning 309/794-5379.

c. The Responsible Federal Agency should coordinate with Ms. Maria Pandullo, Iowa Historic Preservation Agency, ATTN: Review and Compliance Program, State Historical Society of Iowa, Capitol Complex, Des Moines, Iowa 50319 to determine impacts to historic properties.

d. The Rock Island Field Office of the U.S. Fish and Wildlife Service should be contacted to determine if any federally listed endangered species are being impacted and, if so, how to avoid or minimize impacts. The Rock Island Field Office address is: 4469 - 48th Avenue Court, Rock Island, Illinois 61201. Mr. Rick Nelson is the Field Supervisor. You can reach him by calling 309/793-5800.

e. The Iowa Emergency Management Division should be contacted to determine if the proposed project may impact areas designated as floodway. Mr. Dennis Harper is the Iowa State Hazard Mitigation Team Leader. His address is: Hoover State Office Bldg., Level A, Des Moines, Iowa 50319. You can reach him by calling 515/281-3231.

No other concerns surfaced during our review. Thank you for the opportunity to comment on your proposal. If you need more information, please call Dr. Sandra Brewer of our Economic and Environmental Analysis Branch, telephone 309/794-5171.

You may find additional information about the Corps' Rock Island District on our web site at **http://www.mvr.usace.army.mil**. To find out about other Districts within the Corps, you may visit web site: **http://www.usace.army.mil/divdistmap.html**.

Sincerely,

Kenneth A. Barr
Chief, Economic and
Environmental Analysis Branch

Enclosure

STATE HISTORICAL SOCIETY of IOWA

A Division of the Iowa Department of Cultural Affairs

February 7, 2006

In reply refer to:
R&C#: 890516224

Neil Korsmo, Acting Superintendent
United States Department of the Interior
National Park Service
Herbert Hoover National Historic Site
P O. Box 607
West Branch, Iowa 52358-0607

RE: NPS - CEDAR COUNTY - HERBERT HOOVER NATIONAL HISTORIC SITE – DEVELOPMENT OF A STREAM MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT – DRAFT STREAM MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT

Dear Mr. Korsmo,

Thank you for providing our office an opportunity to review the above referenced draft document. We understand that this project will be a federal undertaking for your agency, the National Park Service, and will need to comply with Sections 106 and 110 of the National Historic Preservation Act and with the National Environmental Policy Act. We apologize for our lengthy delay in response.

We agree that most of the alternatives including the preferred alternative would more than likely benefit many of the cultural resources at the Herbert Hoover National Historic Site. **However, at this time, we believe it is premature to concur with a No Adverse Effect determination for this undertaking under 36 CFR 800.5.** In our opinion, consultation between our agencies and other interested parties has not been completed regarding the definition of the Area of Potential Affect for this undertaking and the identification of historic properties under 36 CFR 800.4. Particularly, there are already two recorded archaeological sites (13CD147 and 13CD150) located immediately adjacent to the creek that have not been evaluated for their potential eligibility for listing on the National Register of Historic Places. It is discussed in ***An Archeological Overview and Assessment of the Herbert Hoover National Historic Site, West Branch , Iowa*** prepared by Upper Midwest Archaeology in 2005 that there is a high potential for additional archaeological sites in the area immediately adjacent to the creek. A recommendation was made in that report to conduct systematic examinations of the floodplain and immediate terraces along the creek. We note that we just received for review and comment a copy of the ***Herbert Hoover National Historic Site Cultural Landscape: Inventory Unit Summary and Site Plan***. We note that neither one of these studies were referenced in this document and that the findings and recommendations of these studies were not incorporated into or addressed within this document.

We are confused why a Phase I archeological survey to identify potentially eligible archaeological sites is not listed as a top priority to complete prior to any ground disturbing activities on any of the alternatives. We understand that monitoring of construction activities for previously unidentified archaeological deposits and sites is the preferred method to be implemented for the cultural resources during the course of construction as proposed in Table 7 and Alternatives D and E as part of the **No**

600 EAST LOCUST STREET, DES MOINES, IA 50319-0290 P: (515) 281-5111

Adverse Effect determination. We also understand that any archeological sites encountered would be evaluated and mitigated either by avoidance or excavation. **We do not concur with these conclusions.** We believe that this method for dealing with any encountered archeological sites is not appropriate to be used for this scale of proposed construction activities at a National Historic site with known significant historic properties and considerable potential for containing significant archeological sites and deposits. We are very concerned that these methods are more likely to have **Adverse Effects** on any encountered significant archeological sites because the sites will probably be affected by construction activities before they are identified. Also, consideration of alternatives after identification would be heavily weighted toward excavation and destruction of the site as avoidance and preservation of sites will be less feasible under construction. We also note that there is no discussion about how Section 106 consultation will be carried out for any identified historic properties during the monitoring activities.

If your agency chooses to implement this strategy, we recommend in these types of situations that the responsible federal agency should develop and implement a legal agreement (either a Memorandum of Agreement or a Programmatic Agreement) to establish a course for concluding the section 106 consultation process and outline mitigation strategies for historic properties that will be affected. The purpose of a legal agreement in this case would be to help facilitate consultation on proposed mitigation strategies, such as data recovery excavations or preservation by avoidance, as well as to help facilitate the consultation with other parties that may have an interest in this historic property.

The basic premise of complying with 36 CFR Part 800 involves identification of any historic properties that could be affected by the proposed undertaking. We recommend that the best way to determine whether this proposed project will affect any significant archeological sites is to conduct a Phase I Archaeological survey of the proposed project area. The survey should be conducted prior to any land disturbance or construction activities. The purpose of the Phase I archaeological survey is to locate and evaluate the significance of any presently unidentified archaeological or historical sites which may be affected by the proposed undertaking. We will be in a better position to comment on this project once we have received the results of a formal field investigation and have a better understanding of the project area of potential effects and the cultural resources that it might contain. We recommend that your agency should strongly consider conducting an archaeological survey within the Area of Potential Effect for this proposed undertaking.

Because of these issues with the preliminary identification of historic properties that could be affected by the undertaking, it is our opinion that it remains unclear how both the currently identified and unidentified archaeological sites will be affected by this proposed undertaking. It is also unclear what the affect to the overall cultural landscape would be with the preferred alternative. **For these reasons, we can not currently concur that this undertaking as represented by the preferred alternative will not adversely affect any significant historic properties at the Herbert Hoover National Historic Site.**

In addition, we do not concur with the conclusions regarding the Historic and Cultural Properties in the Impacts to Floodplain Values or Risks to Life and Property section within the Floodplain Statement of Findings in Appendix B. First of all, it appears that the conclusions regarding the effects on the cultural

landscape discussed under Alternative E on page 110 appear to contradict the conclusion presented in the Impacts to Floodplain Values or Risks to Life and Property section within the Floodplain Statement of Findings. Also, we note that the potential effects to any significant archaeological sites within the Area of Potential Effect were not addressed at all.

We have made these comments and recommendations according to our responsibility defined by Federal law pertaining to the Section 106 process. Your agency does not have to follow our comments and recommendations to comply with the Section 106 process. It remains your agency's decision on whether or not to provide additional information to our office or whether or not to proceed with the project without the concurrence of this office. It also remains your agency's decision on how you will proceed from this point for this project.

Please reference the Review and Compliance Number provided above in all future submitted correspondence to our office for this project. Once again, we thank you for the opportunity to review the document. We look forward to further consulting with you on this undertaking. If you have any further questions, please feel free to contact us at the numbers provided below.

Sincerely,

Douglas W. Jones

Douglas W. Jones, Archaeologist
State Historic Preservation Office
State Historical Society of Iowa
(515) 281-4358

Ralph J. Christian, Historian
State Historic Preservation Office
State Historical Society of Iowa
(515) 281-8697

cc: Rachel Franklin Weekley, National Historic Landmark Coordinator, NPS - Midwest Office
Dawn Bringelson, Archeologist, Midwest Archeological Center, NPS
NPS-Midwest Regional Office (N. Chevance)
Parsons-Denver (J. Bryant and D. Rhodes)
Cary Wiesner, NPS HEHO
Lowell J. Soike, Deputy Iowa State Historic Preservation Officer

APPENDIX B: STATEMENT OF FINDINGS

This page intentionally left blank.

Floodplain Statement of Findings

Herbert Hoover National Historic Site Final Stream Management Plan and Environmental Impact Statement

INTRODUCTION

The National Park Service has prepared a *Final Stream Management Plan and Environmental Impact Statement* to provide for protecting and managing historic, cultural, and natural resources, as well as park facilities and visitor experiences at *Herbert Hoover National Historic Site.* This plan will further the park's goals of protecting and interpreting resources that commemorate the life and contributions of Herbert Hoover, the 31st President of the United States. Implementation of the Preferred Alternative would result in increased flood protection for the park's historical and cultural resources and enhance the function and appearance of Hoover Creek, a small perennial stream that bisects the park.

Several park structures are currently threatened by relatively common flood events, and the stream corridor has degraded as changes in local land use have altered the historical hydrology regimen in the area. The primary goals of the *Final Stream Management Plan/EIS* are to:

- reduce the impacts of periodic high flows on cultural resources and historic structures,
- restore the stream to a more historic appearance, and
- restore functional characteristics of the stream.

The purpose of this Floodplain Statement of Findings is to review the final SMP/EIS in sufficient detail to:

- Provide an accurate and complete description of the flood hazard assumed by implementation of the Preferred Alternative, without mitigation.
- Describe the effects on floodplain values associated with the Preferred Alternative.
- Provide a thorough description and evaluation of mitigation measures developed to achieve compliance with Executive Order 11988 (Floodplain Management) and the 2003 NPS Floodplain Management Guideline.

FLOODPLAIN EXTENT

As shown in Figure 1, much of the park lies within the 100-year regulatory floodplain. Anecdotal flood history reveals that Hoover Creek exceeded its banks 18 times in 11 years. Five flooding events requiring temporary relocation of maintenance equipment and materials occurred in 1993 alone. However, a 500-year flood event has not occurred to date.

The incidence of flooding in the area is increased by the lack of an adequate city storm water system to drain even moderately heavy rainfall events. The eastern portions of the park are most susceptible to flooding from backwater of the west branch of Wapsinonoc Creek.

Flooding primarily depends on the amount and timing of precipitation. Annual precipitation averages 33 inches with dry conditions occurring in winter and late summer, and about 60 percent of the precipitation occurs during the growing season (which extends over 183 days from April through September).

Objectives of this Plan

The following objectives were developed to guide the preparation of this final SMP/EIS:

- Reduce flood threat and flood damage to historic structures and other cultural resources.
- Reduce the frequency at which flood events occur within the park by increasing the stream's flow capacity.
- Stabilize banks and reduce entrenchment and lateral cutting of stream.
- Enhance the commemorative character of the park by returning the stream corridor to a more historic appearance.
- Implement modern, sustainable riparian management techniques.
- Provide safe, stable stream banks from which visitors can observe the stream and riparian area.

Description of General Flood Characteristics

Hoover Creek is a perennial stream that drains approximately 1700 acres (2.7 square miles) of agricultural fields, residential land, and a golf course. Hoover Creek joins the west branch of Wapsinonoc Creek just east of the park boundary.

Flood history suggests that Hoover Creek exceeded its banks 18 times from the late 1980s to 2000. This flood frequency is considered rare and corresponds to years of unusually high precipitation. During these events, the maintenance facility was affected by backwater from the west branch of Wapsinonoc Creek, with historic resources being threatened by the higher magnitude flows. Data were collected for floods in 1960, 1967, and 1993. Floods that occurred in 1967 and 1993 appear to be the largest events in recent history.

Stream flow rates in Hoover Creek tend to increase in the spring and early summer when snow melt and precipitation increase. The current average stream channel capacity is approximately 315 cubic feet per second (cfs). In general, a flood occurs whenever the flow exceeds this rate. Currently, the stream's average channel capacity is exceeded at flow rates equivalent to a 2-year event. Downstream portions of the stream experience slower flow rates due to backwater from the west branch of Wapsinonoc Creek. However, the higher volume of water in the downstream portion of the park exceeds the holding capacity of the stream and floods surrounding areas.

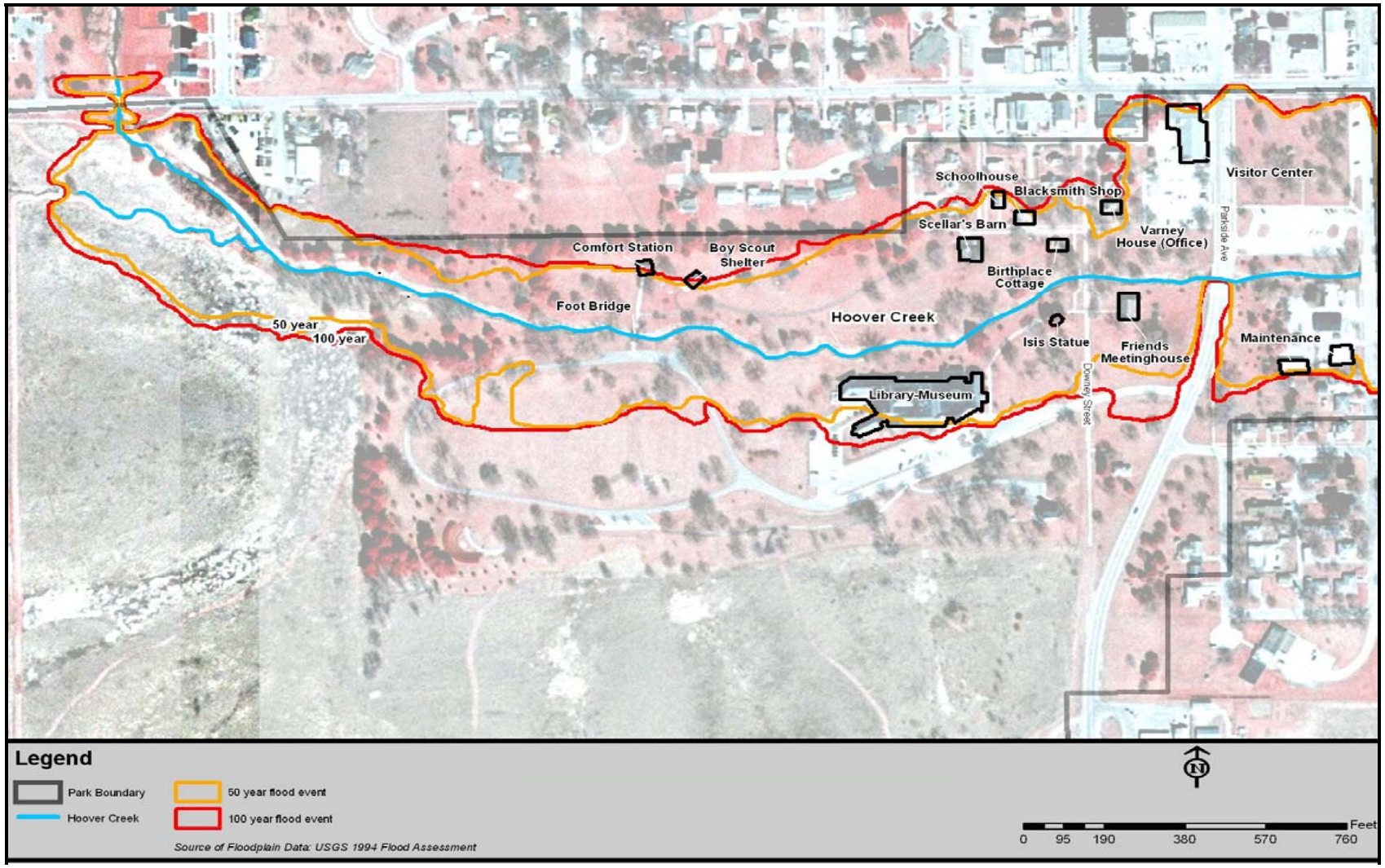

FIGURE 1: FLOODPLAIN MAP OF HERBERT HOOVER NATIONAL HISTORIC SITE

Hoover Creek serves as the primary drainage for the western portions of the city of West Branch, where increased rural residential and urban development have altered the amount and rate of surface water runoff from native prairie conditions. Runoff from hard surfaces, such as roofs and parking lots, flows ten times faster than runoff from undeveloped land. In addition, installation of agricultural drainage tiles conveys precipitation to waterways more quickly than under native prairie conditions. The resulting high velocity of flows allows them to carry greater sediment loads, which increases erosive power.

Changes in flow characteristics have adversely affected the health and stream function of Hoover Creek. Over the past several decades, the stream channel has experienced slumping banks, continual erosion, downcutting of the streambed, and poor water quality from sedimentation and bacterial contamination upstream, possibly from agricultural lands and leaking septic tanks.

The west branch of the Wapsinonoc is not gauged, and no stream flow data are available. It is a perennial stream, which drains a watershed of about 3000 acres (4.7 square miles), and thus has higher flow volumes than those found in Hoover Creek. Its watershed lies immediately to the east and north of the Hoover Creek watershed and comprises agricultural lands, the eastern portions of the city of West Branch, and areas of residential development. The west branch of Wapsinonoc Creek has been subjected to similar watershed development and flow change conditions as described for Hoover Creek.

Within the past decade, agricultural practices in the locale have changed to include reduced tillage and increased maintenance of vegetative groundcover to protect the soil. These practices have probably reduced runoff from agricultural lands in the Hoover Creek drainage, although no studies have been performed to document the occurrence or magnitude of changes. Reductions in runoff from agricultural lands upstream from the park probably have been offset by runoff increases associated with continued conversion of lands to residential and urban uses.

Existing Structures in the Floodplain

The 2003 NPS Floodplain Management Guideline divides actions into the following three groups:

- Class I Actions – include administrative, residential, warehouse and maintenance buildings, and nonexempted (overnight) parking lots.
- Class II Actions – those that would create "an added disastrous dimension to the flood event." Class II actions include schools, clinics, emergency services, fuel storage facilities, large sewage treatment plants, and structures such as museums that store irreplaceable records and artifacts.
- Class III Actions – Class I or Class II Actions that are located in high hazard areas such as those subject to flash flooding.

The Visitor Center, parking lot, and other modern structures located within the 100-year floodplain are categorized as Class I Actions, while the Presidential Library-Museum, which houses irreplaceable records, is categorized as Class II Actions. Other important cultural resources and historic structures, such as the Birthplace Cottage, Blacksmith Shop,

Schoolhouse, and Friends Meetinghouse, are also categorized as Class II Actions. A list of flood frequencies or recurrence intervals for park features of concern is included in Table 1. These frequencies are based on the elevation at which water would contact the structure, to take into account probable damage to historic fabric below the first floor level.

TABLE 1. FLOOD RECURRENCE INTERVALS FOR SEVERAL PARK FEATURES

Feature (upstream to downstream)	Flood Recurrence Intervals
Picnic shelters/comfort station	25 years
Library-Museum	5 years
Scellar's Barn	Less than 5 years
Schoolhouse	43 years
Blacksmith Shop	27 years
Birthplace Cottage	17 years
Isis Statue	15 years
Friends Meetinghouse	Less than 5 years
Visitor Center	7 years
Maintenance Buildings	Less than 5 years

Note: Recurrence interval is defined as the average time interval between occurrences of a flood of a given or greater magnitude (NPS 2004).

THE PROPOSED ACTION

Alternative E – Provide 50-Year Flood Protection is the Preferred Alternative and best addresses the objectives of the plan. This option would construct a storm water detention basin in the northwest section of the park, install a designed channel to increase flow capacity and stream stability, use a drop structure to control downward erosion, and implement storm water management for parking lot runoff. The long-term flood protection (up to 50-year events) afforded the park under this alternative meets the park's mandate to protect historic and cultural resources, without significant impacts to other park resources. This option would also help return the park to its historic landscape setting and improve stream function and stability.

Storm Water Detention Basin

A 138-acre-foot detention (45 million gallon) basin would be constructed by excavating approximately 175,000 cubic yards of soil in the tributary confluence area of the park. The constructed basin would have sloped sides, be vegetated with approved plants, and would not detain water other than during high flows. The embankment would be 12 feet high (from creek channel bottom to top of embankment), 10 feet wide at the top, 106 feet wide at the bottom, and would have upstream and downstream face slopes of 4:1. Four 6-foot diameter culverts would direct water into Hoover Creek at a maximum flow rate of 1,050 cfs (matching channel capacity). The basin would drain freely, detaining inflows only for brief periods.

During precipitation events of greater magnitude than the 50-year event, the detention basin would reach capacity. Storm water would then overtop the embankment and spill into the stream channel. During these rare events, the park would implement its emergency plan and take actions appropriate to protect park resources. During such flows, the flood extent shown in Figure 1 would be exceeded. The total extent of flooding would be dependent on the intensity and duration of the storm event.

Construct New Channel

The new channel would be constructed with a capacity of approximately 1,050 cfs. The new channel would carry flows in excess of the 5-year flood event. This new channel would consist of approximately 2,000 feet of standardized cross section, approximately 500 feet of new meander pattern, a grade control structure to eliminate down-cutting, and reclamation of the portions of the existing channel after the new meanders are complete. The new channel would have a consistent bottom width, uniform streambank elevation and slope ratios, and constant channel capacity. The engineered channel would be created from a point just downstream of the confluence of the north and west tributaries, through the park to the confluence with the west branch of the Wapsinonoc.

To provide long-term protection for the Presidential Library-Museum, approximately 500 feet of the channel would be relocated to a minimum of 100 feet from the structure. Just upstream of the Downey Street Bridge, a concrete or rock drop structure would be installed to control down-cutting. By providing approximately one foot of drop in the stream bed elevation, it would lower the flow rate to reduce erosion potential and improve lateral and vertical stability in the channel.

Storm Water Management Units

Three parking areas with storm drains that lead directly to the creek would be fitted with appropriate storm water management measures. During channel reconstruction, underground oil-water separators (non-mechanical) or small storm water management ponds would be installed to improve the water quality of storm water entering from the parking lots.

Site-specific Flood Protection Measures

The park would continue to maintain the specific flood protection measures currently in place at the various historic structures. These measures include drainage tiles, backflow prevention, external mastic-type sealant, basement sump pumps, and ¼-inch sheets of bentonite on foundations to impede water infiltration. All the buildings west of Downey Street, except Scellar's Barn, are connected to a storm water lift station located at the Barn. These drains carry water directly from the structures to Hoover Creek. These features would continue to receive routine inspection, maintenance, and repair from park staff. The Visitor Center would be treated by installation of waterproof doors to protect the facility from backwater effects up to the 50-year flood event.

Long-Term Flood Mitigation and Disaster Protection

When flood events of greater magnitude than the 50-year event occur, the park would implement their emergency plan and respond appropriately to the threat level. Measures would be taken to protect park resources, public health and safety, and the visitor experience. In the event of a large magnitude flood, such as the 100-year event, repair and rehabilitation

of specific historic structures and other park facilities would likely be required. Specific actions would be determined as part of a post-flood emergency response plan.

The stream channel would be expected to remain stable and undamaged during flows that meet or somewhat exceed the design capacity. Higher magnitude floods that overwhelm the channel and inundate the floodplain could damage the channel. However, the extent of damage would vary based on flow volume, velocity, and duration. For all but the most uncommon events, little channel damage would be anticipated. The park would replant vegetation on stream banks and perform minor bank repairs and stabilization. In the event of a large magnitude event, such as the 100-year flood, repair, rehabilitation, or reconstruction of much of the channel could be necessary. Specific actions would be determined as part of a post-flood emergency response plan.

JUSTIFICATION FOR USE OF THE FLOODPLAIN

The park's enabling legislation was authorized through Public Law 89-119 on August 12, 1965. Congress authorized the acquisition and development of lands in West Branch, Iowa, by the NPS to "preserve in public ownership historically significant properties associated with the life of Herbert Hoover."

These significant properties to be protected by the park include the Birthplace Cottage, Library-Museum, Friends Meetinghouse, and other properties located within the floodplain of Hoover Creek. These structures are located either at their original sites, or have been placed in a contextual setting within the floodplain, which is associated with the early life of Herbert Hoover.

Due to their location within the floodplain of Hoover Creek, these properties are currently at risk of irreversible damage. Because the purpose of the park includes protection of these properties, activities that would occur in the floodplain in order to provide improved flood protection without significantly adversely affecting other park resources would provide an overall improvement to park resources.

IMPACTS TO FLOODPLAIN VALUES OR RISKS TO LIFE AND PROPERTY

Floodplain Values

Project implementation would result in greatly reduced flood frequency. Flows being released from the upstream storage area would be moderated at approximately 1,050 cfs, which would not be expected to exceed channel capacity or spread out onto the adjacent floodplain. Flooding would occur with events greater than the 50-year recurrence interval. This reduced frequency and lateral extent of flooding would have long-term, negligible, adverse effects to floodplain resources and values from a slight reduction in such functions as groundwater recharge and supporting adjacent soils, vegetation, and wildlife habitat.

However, backwater effects from the west branch of Wapsinonoc Creek would continue to cause frequent flooding near the confluence. Therefore, no change would occur to floodplain values or function at the east end of the park.

Historic and Cultural Properties

Implementation of the Preferred Alternative would have long-term moderate benefits on important park resources by improving flood protection. Stream course improvements and floodwater detention would have long-term moderate beneficial effects on historic structures and other park buildings. Benefits to the collections would be moderate and long-term.

Improvements to the creek would have short-term, direct minor, adverse effects on the cultural landscape from removal of vegetation and soils. Ponding of water that backs up from Wapsinonoc Creek would still cause some short-term minor adverse effects in the areas around the Friends Meetinghouse and the maintenance buildings.

Health and Safety

The park closes to visitation during flood events. Therefore, flood-related health and safety issues result from staff emergency response duties. The decreased frequency of flooding would result in some reduced risk to park employees as emergency response occurs less frequently. In addition, stabilizing the stream banks would reduce risks to staff performing landscape maintenance activities, and would reduce slip and fall hazards to visitors. These improvements would provide long-term, minor, benefits to health and safety.

Flooding events do not include rushing flows generally associated with loss of life, debris generation, infrastructure wash-out, etc. No injuries related to flooding have been reported.

Downstream Effects

Providing storm water detention and increasing the channel capacity within the park would not exacerbate downstream flood effects. A greater volume of flow would remain in the park for a longer period and would be released at a controlled rate. Thus, the Preferred Alternative would not increase backwater effects at the confluence with the west branch of Wapsinonoc Creek, nor increase flood potential further downstream.

MITIGATION

Actions occurring within the floodplain would be subject to the provisions of the 2003 NPS Floodplain Management Guideline and Executive Order 11988 (Protection of Floodplains). The following mitigation measures would be applied or maintained to protect facilities and/or park resources within the floodplain:

- Continued protection for individual historic and other park structures are described above and include building drainage, pumps, and foundation sealants.
- The park's cultural landscape, which includes the Hoover Creek corridor, would be protected by maintaining important vistas and enhanced by restoring the appearance of the stream to that present during the period of significance.
- Construction best management practices would be used for in-stream work, to prevent additional sediment and contaminants from entering the creek and affecting water quality.

CONCLUSION

The proposed action would reduce potentially hazardous conditions associated with flooding by reducing the frequency of flooding in the park. Providing protection for park resources from floods up to and including the 50-year event would best meet the plan objectives and provide long-term protection for irreplaceable historic and cultural resources of national significance.

The NPS concludes that the proposed action would reduce the impacts of potentially hazardous and damaging conditions associated with flooding. Individual permits with other federal and cooperating state and local agencies would be obtained prior to construction activities. Mitigation and compliance with regulations and policies to prevent impacts to water quality, floodplain values, and loss of property or human life would be strictly adhered to during and after construction. Floodplain values would be altered, because the project would reduce flood frequency far below current occurrence rates, resulting in long-term, minor, adverse effects to function such as groundwater recharge, support of adjacent soils, vegetation, and wildlife. However, no significant long-term adverse impacts would occur from the proposed actions. Therefore, the NPS finds the proposed action to be acceptable under Executive Order 11988 for the protection of floodplains.

Recommended:

Superintendent, Herbert Hoover National Historic Site	Date

Certification of Technical Adequacy and Statewide Consistency:

Water Resources Division, National Park Service	Date

Approved:

Regional Director, Midwest Region National Park Service	Date

This page intentionally left blank.

APPENDIX C: LISTS OF PLANTS AND WILDLIFE OCCURRING IN THE PROJECT AREA

This page intentionally left blank.

Plant Species Likely to Occur in the Project Area

Common name	Scientific name
Grasses	
Kentucky bluegrass[1]	*Poa pratensis*
Big bluestem	*Andropogon gerardii*
Indian grass	*Sorghastrum nutans*
Switchgrass	*Panucum virgatum*
Little bluestem	*Schizachyrium scoparium*
Side-oats grama	*Bouteloua curtipendula*
Canada wildrye	*Elymus canadensis*
Reed canary grass[2]	*Phalaris arundinacea*
Smooth brome[2]	*Bromus inermis*
Forbs	
Tall goldenrod	*Solidago canadensis*
Prairie sunflower	*Helianthus arvense*
Hairy aster	*Aster pilosus*
Saw-tooth sunflower	*Helianthus grosseserratus*
Prairie ragwort	*Senecio plattensis*
Wild bergamot	*Monarda fistulosa*
Evergreen trees	
Eastern arborvitae[1]	*Thuja* sp.
Juniper	*Juniperus virginiana.*
Spruce[1]	*Picea* spp.
White fir[1]	*Abies concolor*
White pine[1]	*Pinus strobes*
Yew [1]	*Taxus* sp.
Redwood[1]	*Metasequoia glyptostroboides*
Deciduous trees	
Chestnuts	*Castanea* spp.
Black walnut	*Juglans nigra*
Redbud	*Cercis canadensis*

Plant Species Likely to Occur in the Project Area	
Common name	**Scientific name**
Buttonbush	*Cephalanthus occidentalis*
Shadlow serviceberry	*Amelanchier canadensis*
Shagbark hickory	*Carya ovata*
Bur oak	*Quercus macrocarpa*
Hackberry	*Celtis occidentalis*
Red oak	*Quercus rubra*
White oak	*Quercus alba*
Hawthorn	*Crataegus mollis*
American plum	*Prunus americana*
Pin oak	*Quercus palustris*
Black willow	*Salix nigra*
Weeping willow	*Salix babylonica.*
Box elder	*Acer negundo*
Maples	*Acer* spp.
River birch	*Betula nigra*
Green ash	*Fraxinus pennsylvanica*
Kentucky coffeetree	*Gymnocladus diocum*
Butternut	*Juglans cinera*
Crabapple	*Malus* sp.
Elderberry	*Sambucus canadensis*
White mulberry[2]	*Morus alba*
Siberian elm[2]	*Ulmus pumila*

[1]non-native plant species

[2]non-native invasive plant species

Wildlife Species Occurring in the Project Area	
Common name	**Scientific name**
Mammals	
Opossum	*Diadelphis virginiana*
Red fox	*Vulpes vulpes*
Coyote	*Canis latrans*
White-tailed deer	*Odocoileus virginianus*
Mouse family	*Peromyscus* spp. and *Microtus* spp.
Pocket gopher	*Geomys bursaritus*
Eastern cottontail rabbit	*Sylvilagus floridanus*
Striped skunk	*Mephitis mephitis*
Squirrels	*Sciuridae* family
Raccoon	*Procyon lotor*
Eastern mole	*Scalopus aquaticus*
Woodchuck	*Marmota monax*
Big brown bats	*Eptesicus fuscus*
Reptiles and Amphibians	
Eastern fox snake	*Elaphe vulpine*
Western ribbon snake	*Thamnophis proximus proximus*
Bullsnake	*Pituophis melanoleucus savi*
Rat snake	*Elaphe obsolete*
Plains garter snake	*Thamnophis radix*
Common garter snake	*Thamnophis sirtalis*
American toad	*Bufo americanus*
Chorus frogs	*Pseudacris triseriata*
Birds	
American goldfinch	*Carduelis tristis*
American robin	*Turdus migratorius*
Bobolink	*Dolichonyx oryzivorus*
Eastern Bluebird	*Sialis sialis*
Dekay's brown snake	*Storeria dekayi*
Grasshopper sparrow	*Ammodramus savannarum*

Wildlife Species Occurring in the Project Area	
Common name	**Scientific name**
European starling	*Sturnus vulgaris*
Red-headed woodpecker	*Melnerpes erthrocephalus*
Indigo bunting	*Passerina cyanea*
Killdeer	*Charadrius vociferous*
Dickcissel	*Spiza Americana*
Northern cardinal	*Cardinalis cardinalis*
Eastern meadowlark	*Sturnella magna*
Ring-necked pheasant	*Phasianus colchicus*
Sedge wren	*Cistothorus platensis*
Red-winged blackbird	*Agelaius phoeniceus*
Western meadowlark	*Sturnella neglecta*
Insects	
Monarch butterflies	*Danaus plexippus*
Fishes	
Creek chub	*Semotilus atromaculatus*
unidentified dace	*Rhinichthys* sp.

APPENDIX D: LAWS, REGULATIONS, AND POLICIES

This page intentionally left blank.

Appendix D includes summaries and descriptions of the application of various Federal Laws, Regulations, Executive Orders, policies, and guidelines that are applicable to the National Park Service's management of resources in the natural and human environment.

CULTURAL RESOURCES

The 1916 **Organic Act** established the NPS with the fundamental purpose of conserving park resources and values while providing for the public enjoyment of the parks and leaving resources unimpaired for future generations. "If they [resources] are degraded or lost, so is the parks' reason for being" (NPS 1998). Thus the NPS has become the steward of many of America's most important cultural resources, defined as archeological resources, cultural landscapes, ethnographic resources, historic and prehistoric structures, and museum collections.

Finite and nonrenewable, these tangible resources begin to deteriorate almost from the moment of their creation, and once destroyed, these resources cannot be recovered.

The NPS cultural resource management program involves research, planning, stewardship, and preservation. As part of that stewardship, numerous laws, regulations, and policies require that the NPS achieve the desired conditions described in "Outcomes of the Proposed Management Action," below, within Herbert Hoover National Historic Site for cultural resources eligible for or listed on the National Register of Historic Places. (The entire park is listed on the National Register.) While most collections, including artifacts and archival materials, are not eligible for the National Register, their management and protection also are provided by many of the same laws and guidelines.

The **National Historic Preservation Act (NHPA),** as amended, requires in §106 that federal agencies with direct or indirect jurisdiction over undertakings take into account the effect of those undertakings on properties that are listed on, or eligible for listing on, the National Register of Historic Places. This act and its implementing regulations provide guidance for deciding whether cultural resources are of sufficient importance to be determined eligible for listing on the National Register of Historic Places. The NHPA uses the term "historic properties," to mean all prehistoric and historic sites, buildings, structures, and objects included in, or eligible for inclusion in, the National Register of Historic Places. Regulations that guide the implementation of NHPA are contained in *36 Code of Federal Regulations, Part 800* (36 CFR 800).

The National Environmental Policy Act (NEPA) declared a federal policy to preserve important historic, cultural, and natural aspects of our national heritage. It requires federal agencies to employ a systematic, interdisciplinary approach to ensure the integrated use of the natural and social sciences in planning and in decision-making activities that may affect the human environment. Implementing regulations for NEPA are contained in *40 Code of Federal Regulations, Part 1500* (40 CFR 1500).

The management and protection of cultural resources are guided by a variety of laws and policies, including:

- National Historic Preservation Act of 1966, as amended, and its implementing regulations at 36 CFR 800;

- Antiquities Act of 1906;
- NPS Organic Act of 1916;
- Historic Sites Act of 1935;
- Archaeological and Historic Preservation Act of 1974;
- Archaeological Resources Protection Act of 1979;
- General Authorities Act of 1976;
- Management of Museum Properties Act of 1955, as amended;
- National Environmental Policy Act of 1969;
- Executive Order 11593;
- *Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation*;
- *Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation with Guidelines for the Treatment of Cultural Landscapes*;
- Departmental Manual 411 DM 1-3, Managing Museum Property;
- Departmental Manual 519 DM 1, Protection of the Cultural Environment; Departmental Manual 519 DM 2, Preservation of American Antiquities and Treatment and Disposition of Native American Cultural Items;
- Programmatic Agreement among the NPS, Advisory Council on Historic Preservation, and the National Council of State Historic Preservation Officers (1995);
- NPS *Management Policies 2001*;
- Director's Order 28, *Cultural Resource Management*;
- Director's Order 28A, *Archeology*; and
- Director's Order 24, *NPS Museum Collections Management*.

WATER RESOURCES

Stream Function and Floodplains

NPS Management Policies. *Management Policies 2001* states that the NPS, in managing floodplains on park lands, "will (1) manage for the preservation of floodplain values; (2) minimize potentially hazardous conditions associated with flooding; and (3) comply with the NPS Organic Act and all other federal laws and Executive orders related to the management of activities in flood-prone areas." Specifically, the NPS will "protect, preserve, and restore the natural resources and functions of floodplains" (NPS 2000a). Management policy also calls for the protection of stream processes that create habitat features such as floodplains, riparian systems, woody debris accumulations, terraces, gravel bars, riffles, and pools. Stream processes or functions to protect, preserve, and restore include flooding, stream migration, and associated erosion and deposition (NPS 2000a).

Executive Order 11988, Floodplain Management. Executive Order 11988, Floodplain Management, mandates all federal agencies to develop agency-specific guidance, provide leadership, and take action to:

- Reduce the risk of flood loss;
- Minimize the impact of floods on human safety, health, and welfare; and
- Restore and preserve the natural and beneficial values served by floodplains.

Iowa Department of Natural Resources (IDNR): Floodplain Development Permit. The Iowa Department of Natural Resources has authority to regulate construction on all floodplains and floodways in the state for the purpose of establishing and implementing a program to promote the protection of life and property from floods and to promote the orderly development and wise use of the floodplains of the state. Any person who desires to construct or maintain a structure, dam, obstruction, deposit, or excavation, or allow the same in any floodplain or floodway, has a responsibility to contact the department to determine whether approval is required from the department or a local government authorized to act for the department (IDNR 2004).

Water Quality

Clean Water Act. The objective of the Clean Water Act (CWA), or Federal Water Pollution Control Act of 1972, and its amendments is to "restore and maintain the chemical, physical and biological integrity of the nation's waters." The overall goal of the Clean Water Act is to produce waters of the United States that are "fishable and swimmable." A primary means for evaluating and protecting water quality is the establishment and enforcement of water quality standards. Under the Clean Water Act, the federal government delegated responsibility for establishing water quality criteria to each state, subject to approval by the EPA. Water quality standards consist of three parts: 1) designated beneficial uses of water [e.g., drinking, recreation, aquatic life]; 2) numeric criteria for physical and chemical characteristics for each type of designated use; and 3) an "antidegradation" provision to protect uses and water quality.

In accordance with the Clean Water Act, states define the uses for waters occurring within their borders, and each water body must be managed in accordance with its designated uses. Water quality standards are established for each designated use. Standards must be at least as stringent as those established by the EPA. In many cases, states have adopted the same standards as the EPA.

The EPA has developed national recommended ambient water quality criteria for approximately 120 priority pollutants for the protection of both aquatic life and human health (through ingestion of water, fish, or shellfish) (EPA 1999). Under section 313 of the Clean Water Act, the NPS and all other federal agencies and departments must comply with all federal, state, interstate, and local requirements regarding the control and abatement of water pollution. This includes management of any activity that may result in the discharge or runoff of pollutants.

Under Section 404 of the Clean Water Act, the U.S. Army Corps of Engineers regulate the discharge of dredged or fill material resulting from water resources projects (such as dams or levees) into the waters of the U.S. through a permit program. The Section 404(b)(1)

guidelines are the substantive criteria by which proposed dredged material discharge actions are evaluated. The U.S. EPA also maintains general environmental oversight, including Section 404(c) permit veto authority, if there will be an "unacceptable adverse effect." The basic premise of the program is that no discharge of dredged or fill material can be permitted if a practicable alternative exists that is less damaging to the aquatic environment or if the nation's waters would be significantly degraded.

NPS Management Policies. *Management Policies 2001* states that the NPS "will determine the quality of park surface and groundwater resources and avoid, whenever possible, the pollution of park waters by human activities occurring within and outside of parks" (NPS 2000). Management Policies 2001 also state that the NPS will "take all necessary actions to maintain or restore the quality of surface waters and groundwaters within the parks consistent with the Clean Water Act and all other applicable federal, state, and local laws and regulations".

Iowa Department of Natural Resources. The Iowa Department of Natural Resources seeks to ensure that all Iowans have surface waters that are fishable and swimmable to the fullest extent practicable, safe drinking water, groundwater that is free from contamination, protection from the adverse effects of floods, and water resources that are put to their best beneficial uses. This department manages water quality through the state's water quality standards, of which there are three components. These include designated uses, water quality criteria to protect those uses, and antidegradation policy. The intent of the antidegradation policy is to protect and maintain the existing physical, biological, and chemical integrity of all waters of the state (IDNR 2005). In addition, the Iowa Department of Natural Resources seeks to control erosion and water quality and manage construction sites to reduce off-site water pollution. Therefore, land-disturbing construction activities associated with the selected stream management alternative would require a stormwater discharge permit under the National Pollutant Discharge Elimination System (NPDES).

VISITOR UNDERSTANDING AND APPRECIATION

Management Policies 2001 (NPS 2000a) states that the enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all park units and that the NPS therefore seeks to:

- Provide opportunities for forms of enjoyment that are uniquely suited and appropriate to the superlative natural and cultural resources found in a particular park unit.
- Defer to others to meet the broader spectrum of recreational needs and demands that are not dependent on a national park setting. Those others can include local, state, and other federal agencies; private industry; and non-governmental organizations.

Management controls are sometimes necessary in order to maintain the quality of visitor experience and protection of resources. This might include closures or restrictions on access to park facilities or sites. Under Section 8.2 (Visitor Use) of *Management Policies 2001* (NPS 2000a), any closures or restrictions, other than those imposed by law, must be consistent with applicable laws, regulations, and policies, and (except in emergency situations) require a written determination by the superintendent that such measures are needed to:

- protect public health and safety,
- prevent unacceptable impacts to park resources and values,
- carry out scientific research,
- minimize visitor use conflicts, or
- otherwise implement management responsibilities.

Part of the purpose of the National Historic Site is to provide understanding and appreciation of the contributions of Herbert Hoover. Goals for the visitor experience were provided in the general management plan:

- "Visitors to the Historic Site safely enjoy and are satisfied with the availability, accessibility, diversity, and quality of park facilities, services, and appropriate recreational activities."
- "Park visitors and the general public understand and appreciate that the Historic Site was established to commemorate the life, career, and accomplishments of Herbert Hoover, thirty-first President, by preserving the resources associated with his life in West Branch, Iowa" (NPS 2004a).

PUBLIC HEALTH AND SAFETY

NPS *Management Policies 2001* (2000a) requires that parks:

- provide a safe and healthful environment for visitors and employees. Management actions strive to protect human life and provide injury-free visits, and
- reduce or remove known hazards and apply other appropriate measures, including closures, guarding, signing, or other forms of education

In addition, *Management Policies 2001* specifies that park visitors assume a substantial degree of risk and responsibility for their own safety when visiting areas that are managed and maintained as natural, cultural, or recreational environments (NPS 2000a).

PARK OPERATIONS

NPS *Management Policies 2001* requires that park operations achieve the following conditions:

- Park facilities and operations demonstrate environmental leadership by incorporating sustainable practices to the maximum extent practicable in planning, design, siting, construction, and maintenance, including preventive and rehabilitative maintenance programs (NPS 2000a).

SOILS

Current laws and policies require that soils in national park units function as naturally as possible as specified in NPS *Management Policies 2001* (NPS 2000a). The NPS will "seek to prevent the unnatural erosion, physical removal, or contamination of the soil, or its

contamination of other resource" (NPS 2000a). Management actions will be taken to prevent or minimize adverse, potentially irreversible impacts on soils. The park's general management plan and resource management plans support preserving the natural character of resources, including soils. Soil resources should be monitored regularly and mitigation provided.

VEGETATION

As stated in the NPS *Management Policies 2001* (NPS 2000a) the "fundamental purpose" of the national park system is to conserve park resources and values, and to provide for the public enjoyment of the park's resources and values to the extent that the resources will be left unimpaired for future generations. Vegetation is identified as a park resource (NPS 2004a). *Management Policies 2001* also provide general principles for the maintenance of natural resources in the park by:

- "preserving and restoring the natural abundances, diversities, dynamics, distributions, habitats, and behaviors of native plant and animal populations and the communities and ecosystems in which they occur; and
- "minimizing human impacts on native plants, animals, populations, communities, and ecosystems and the processes that sustain them."

WILDLIFE

As stated in the NPS *Management Policies 2001* (2000a) the "fundamental purpose" of the national park system is to conserve park resources and values and to provide for the public enjoyment of the parks resources and values to the extent that the resources will be left unimpaired for future generations. Native wildlife is identified as a park resource (NPS 2000a). *Management Policies 2001* (NPS 2000a) provides general principles for the maintenance of natural resources in the park by:

> "preserving and restoring the natural abundances, diversities, dynamics, distributions, habitats, and behaviors of native plant and animal populations and the communities and ecosystems in which they occur."

APPENDIX E: ROSGEN STREAM CLASSIFICATIONS

This page intentionally left blank.

ROSGEN STREAM CLASSIFICATIONS

Stream Type	Sensitivity to Disturbance[a/]	Recovery Potential[b/]	Sediment Supply[c/]	Stream bank Erosion Potential	Vegetation Controlling Influence[d/]
C1	**low**	**very good**	**very low**	**low**	**moderate**
C2	**low**	**very good**	**low**	**low**	**moderate**
C3	moderate	good	moderate	moderate	very high
C4	very high	good	high	very high	very high
C5	very high	fair	very high	very high	very high
C6	very high	good	high	high	very high
E3	high	good	low	moderate	very high
E4	very high	good	moderate	high	very high
E5	very high	good	moderate	high	very high
E6	very high	good	low	moderate	very high
F1	low	fair	low	moderate	low
F2	low	fair	moderate	moderate	low
F3	moderate	poor	very high	very high	moderate
F4	extreme	poor	very high	very high	moderate
F5	very high	poor	very high	very high	moderate
F6	**very high**	**fair**	**high**	**very high**	**moderate**
G1	low	good	low	low	low
G2	moderate	fair	moderate	moderate	low
G3	very high	poor	very high	very high	high
G4	extreme	very poor	very high	very high	high
G5	extreme	very poor	very high	very high	high
G6	**very high**	**poor**	**high**	**high**	**high**

a/ Includes increases in streamflow magnitude and timing and/or sediment increases.
b/ Assumes natural recovery once cause of instability is corrected.
c/ Includes suspended and bedload from channel derived sources and/or from stream adjacent slopes.
d/ Vegetation that influences width/depth ratio-stability.

This page intentionally left blank.

APPENDIX F: PROGRAMMATIC AGREEMENT

This page intentionally left blank.

R+C 8905162254

APR 14 2006

PROGRAMMATIC AGREEMENT

BETWEEN

THE NATIONAL PARK SERVICE

AND

THE IOWA STATE HISTORIC PRESERVATION OFFICE

REGARDING

HOOVER CREEK STREAM MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT
HERBERT HOOVER NATIONAL HISTORIC SITE
WEST BRANCH, IOWA

WHEREAS the National Park Service (NPS) has prepared a Stream Management Plan and Environmental Impact Statement which includes proposals to conduct a flood mitigation project on the stream informally known as "Hoover Creek" at Herbert Hoover National Historic Site in Cedar County, Iowa, hereafter referred to as the undertaking; and

WHEREAS the Herbert Hoover National Historic Site is listed on the National Register of Historic **Places** (NRHP); and

WHEREAS the NPS, in accordance with Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. Section 470f) (NHPA) and its implementing regulations in 36 CFR Part 800, is required to complete cultural resource investigations designed to identify historic properties within the area of potential effects (APE) for the undertaking; and

WHEREAS those cultural resource investigations, including preparation of archeological inventory and evaluations, phase II evaluations, and potential data recovery (Phase III mitigation) remain to be completed; and

WHEREAS future design changes may require alteration of the APE to include locations which have not been investigated to identify historic properties; and

WHEREAS the undertaking as currently designed may have an effect on currently unknown archaeological sites, some of which may be eligible for addition to the NRHP and/or listing in the Iowa Site Record; and

WHEREAS, in accordance with 36 CFR Part 800, the NPS acknowledges and accepts the advice of and conditions outlined in the Advisory Council on Historic Preservation's (Council) *Recommended Approach for Consultation on the Recovery of Significant Information from Archaeological Sites,* (64 FR 27085-27087) effective June 17, 1999; and

WHEREAS, the consulting parties agree that archeological inventories and evaluations, Phase II testing and possible data recovery of significant information from the archaeological sites listed above may be done in accordance with the published guidance; and

WHEREAS, the consulting parties agree that it is in the public interest to expend funds to implement this project through the recovery of significant information from archaeological sites to mitigate adverse effects of the project; and

WHEREAS, to the best of our knowledge and belief, no human remains, associated or unassociated funerary objects or sacred objects, or objects of cultural patrimony as defined in the Native American Graves Protection and Repatriation Act (25 U.S.C. 3001), are expected to be encountered in the archaeological work; and

WHEREAS, in accordance with 36 CFR 800.2, the NPS has consulted with the Iowa State Historic Preservation Office (SHPO) regarding the affect of the undertaking on historic properties; and

WHEREAS, in accordance with 36 CFR 800.2, the NPS shall reopen consultation with the SHPO, Native American tribes, and other interested parties should historic properties of religious or cultural significance to Native American tribes be identified in locations that become part of the undertaking through design changes or additions; and

NOW, THEREFORE, The NPS shall ensure that the following stipulations and conditions are implemented in a timely manner and with adequate resources in compliance with the National Historic Preservation Act of 1966 (16 U.S.C. 470f) to assure that all locations within the current and ultimate APE for the undertaking are adequately surveyed, and that all adverse effects to historic properties that are or may be identified are resolved

STIPULATIONS

The NPS shall insure that the project area is secured and protected against damage caused by construction activities until the measures agreed upon in this agreement are implemented.

A. Completion of Archaeological Testing and Reporting

The NPS shall develop an archeological testing and inventory plan for areas likely to be impacted by the undertaking. This plan will be developed and implemented by the Midwest Archeological Center (MWAC) or other qualified archeologists, prior to and in coordination with the construction activities. Work will be done in a manner consistent with the *Secretary of Interior's Standards and Guidelines for Archeological Documentation*.

National Register eligibility determinations for individual sites will be made in consultation with the SHPO. A report on the results of this investigation will be submitted to the SHPO for review. All comments or concerns that may be expressed by the SHPO or any other consulting party regarding the investigations shall be fully addressed prior to ground disturbing activity within the project corridor, including the need for additional surveys to identify historic properties and for consultation with the SHPO and other consulting parties regarding resolution of any adverse effects to historic properties.

B. Survey of Newly Identified APE. If design changes are made before or during construction such that additional areas not previously surveyed shall become subject to impact from the undertaking, a survey to identify historic properties shall take place prior to ground disturbing activities in these areas. Full reports on any such investigations will be submitted to the SHPO for review under Section 106.

All comments or concerns that may be expressed by the SHPO or any other consulting party regarding the investigations shall be fully addressed prior to ground disturbing activity within the new APE, including the need for additional surveys to identify historic properties and for consultation with the SHPO and other consulting parties regarding resolution of any adverse effects to historic properties

C. Mitigation of Adverse Effects to Historic Properties. NPS will ensure that the following measures are carried out in order to mitigate adverse effects to historic properties.

1. If any archeological sites are identified and determined to be National Register eligible the NPS shall consult with all parties. Supplemental research questions will be developed for each site and the Data Recovery Plan will be implemented to recover significant information from the impacted portions prior to ground disturbing activities at the sites.

2. The NPS shall have the data recovery conducted by MWAC staff , or other persons or firms whose education and professional experience meets the Secretary of the Interior's *Professional Qualification Standards* (48 FR 44738-447389).

3 During the course of the data recovery field work, the SHPO will be provided with monthly progress reports and will make one or more site visits in order to review the data recovery field work for thoroughness and compliance with the DRP so that at its completion, the letting of the flood mitigation project may be allowed to proceed and will not be delayed while the laboratory work and writing of the report are being finished.

4 A report documenting the investigations shall be prepared and a draft submitted to the SHPO and any consulting party upon their request for review regarding the reports professional and technical compliance with the data recovery plan, with the Secretary of Interior's *Guidelines for Archeological Documentation* (48 FR 44716), and with the *Guidelines for Archaeological Investigations in Iowa(1999)*.

5. All concerns expressed by the SHPO or any consulting party regarding the report will be addressed in the final report, and the final report will be filed with the State Historical Society of Iowa and with the Office of the State Archaeologist.

6. Archaeological material recovered from the site and complete records of the data recovery will be archived in accordance with the guidance of 36 CFR Part 79 at an approved NPS facility so as to be available for future study by archaeologists.

D. Unexpected Discovery. If, during construction of the undertaking, undetected archaeological materials should be uncovered, the NPS will:

1. Cease construction activities which may disturb subsurface materials in the area of the resource and notify the SHPO of the discovery.

2. The SHPO or an NPS archeologist will immediately inspect the work site and determine the extent of the affected archaeological resource Construction work may then continue in the area outside the archaeological resource as it is defined by the SHPO, or by SHPO in consultation with NPS archaeologists.

3. Within 14 days of the original notification of discovery, the NPS, in consultation with the SHPO, will determine the National Register eligibility of the resource The NPS may extend this 14-day calendar period one time for an additional seven days by providing written notice to the SHPO prior to the expiration date of said 14-day calendar period.

4. If the resource is determined eligible for the National Register, the NPS shall submit a plan for its avoidance, protection, recovery of information or destruction without data recovery to SHPO for review and comment. The NPS will notify all consulting parties of the unanticipated discovery and provide the proposed treatment plan for their consideration. The SHPO and consulting parties will have 7 days to provide comments on the proposed treatment plan to the NPS upon receipt of the information.

5. Work in the affected area shall resume pending either:

(a) Development and implementation of an appropriate data recovery plan or other recommended mitigation measures as listed in (D)(4) above; or

(b) Determination that the newly located archaeological materials are not eligible for inclusion on the National Register.

E. Protection of Human Burials. In the event that human remains or burials are encountered during archeological investigations or any construction activities associated with the undertaking, the NPS will comply with the *Native Americans Graves Protection and Repatriation Act* 26 U.S.C. 3001 through 3005), following NPS Director's Order 28 and appendix R (as recently revised) of the *Cultural Resource Management Guidelines*.

If the remains are determined through this process to be not native American, the NPS will notify the FBI and appropriate state agencies for consultation on whether the burial or remains constitute a crime scene. If so, NPS Law Enforcement guidelines will be followed. If not, then NPS will work with appropriate state agencies on determination of identity, notification of relations, and reburial.

F. Dispute Resolution. Should either party to this agreement object in writing to any action carried out or proposed with respect to the undertaking or implementation of this agreement, the parties shall consult to resolve the objection. If after initiating such consultation, the objection cannot be resolved, the agency shall forward all documentation relevant to the objection to the Advisory Council on Historic Preservation (Council), including the agency's proposed response to the objection. Within 45 days after receipt of all pertinent documentation, the Council shall exercise one of the following options:

1. Advise the agency that the Council concurs in the agency's proposed response to the objection, whereupon the agency will respond to the objection accordingly;

2 Provide the agency with recommendations, which the agency shall take into account in reaching a final decision regarding its response to the objection; or

3 Notify the agency that the objection will be referred for comment pursuant to 36 CFR 800.7(a)(4), and proceed to refer the objection and comment. The agency shall take the resulting comment into account in accordance with 36 CFR 800.7(c)(4) and Section 110(1) of NEPA.

G. Other Terms and Conditions

1. If the stipulations of this Programmatic Agreement have not been implemented within six (6) years from the date of its execution, the consulting parties shall review its provisions to determine whether revisions are needed. If revisions are needed, the signatories will consult in accordance with 36 CFR Part 800 to make such revisions

2. Modification, amendment, or termination of this agreement shall be accomplished by the signatories in consultation among the parties in the same manner as the original agreement

3. This agreement shall be null and void if its terms are not carried out by January 1, 2015, unless the signatories agree in writing to an extension for carrying out its terms.

Execution of this Programmatic Agreement by the National Park Service and the Iowa SHPO, its subsequent acceptance by the Council, and implementation of its terms, evidence that NPS has afforded the Council an opportunity to comment on this undertaking and its effects on historic properties, and that NPS has taken into account the effects of the undertaking on historic properties

NATIONAL PARK SERVICE

By: Cheryl A. Schneider 4-11-06
Date

IOWA STATE HISTORIC PRESERVATION OFFICER

By: Rowell J. Sokie April 18, 2006
Date

This page intentionally left blank.

As the nation's principal conservation agency, the Department of the Interior has the responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

June 2006